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AUTHOR Mithaug, Dennis E.; Stewart, Jeffery E.
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ABSTRACT

In this research competition is examined conceptually in order to develop a functional definition that will facilitate systematic research on the process. Competitive behavior is defined as behavior that is a positive function of a comparison of the results of one person's behavior with the results of another's behavior. Comparisons, in turn, can be identified operationally when a person looks at the results of his own performance and at the results of another's performance. In the research, the effects of competitive contingencies (rewards for a comparison outcome) on social comparisons, academic performance and competition were investigated. In general, the amount of competitive contingent reward accounted for changes in the three variables. Limitations of this finding were discussed in light of data from one subject whose competitive behavior did not maintain during competitive contingencies. (Author)

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THE EFFECTS OF COMPETITIVE CONTINGENCIES ON SOCIAL COMPARISONS, ACADEMIC PERFORMANCE, AND COMPETITION

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Dennis E. Mithaug

Jeffrey E. Stewart

Experimental Education Unit

Child Development and Mental Retardation Center

University of Washington

CG 007 451

THE EFFECTS OF COMPETITIVE CONTINGENCIES ON SOCIAL COMPARISONS, ACADEMIC PERFORMANCE, AND COMPETITION

Cooperation and competition are fundamental social processes that constitute the building blocks of more complex social organizations. Although they have been the topic of theoretical discussions for years, only recently have the rigors of experimental analysis been utilized to investigate systematically conditions that promote and sustain them. One of these processes, cooperation, has been investigated experimentally by Azrin and Lindsley (1956), Cohen (1962), Cohen and Lindsley (1964), Mithaug and Burgess (1967, 1968), and Mithaug (1969). And only recently has cooperation been identified functionally. Mithaug (1969) explicitly defined cooperation in terms of coordinated behavior and its consequence, progress on a common task. This definition allows reward conditions resulting from task completion to be systematically manipulated and their effects on cooperation observed.

Competition has not received as much attention from the behavioral researcher. Although some have touched on competition briefly (Cohen, 1962), (Lindsley, 1966), careful analysis of the functional nature of the process and systematic research in the area is lacking. The importance of identifying competition functionally can be illustrated from the following definitions. Here the emphasis is on the goal, end, or scarce reward rather than the interaction that characterizes the process.

> Simultaneous pursuit of goals by two or more persons or groups under conditions where goal-achievement by one person precludes identical goal-achievement by another. (Lundberg, Schrag, & Larsen, 1963)

> A less violent form of opposition in which two or more persons or groups struggle for some end or goal but in the course of which attention is focused chiefly on the reward rather than on the competitor. (Bertrand, 1967)

The difficulty with such definitions arises when one contrives a condition where two experimental subjects cannot receive a reward simultaneously. Does this necessarily mean the subjects will compete? Whether or not subjects will compete under such conditions is, of course, an empirical question. What, then, is the type of interaction that characterizes competition?

A careful examination of competitive behavior reveals that social comparisons play a central role. When one person competes with another, he strives to outdo the other on some task. Three distinguishable events can be identified here: 1) the person emits behavior "X", 2) he looks at the results of his behavior "X" and at the results of another's behavior on the same or a comparable task, i.e., person compares his results with those of another, 3) person subsequently increases the frequency of emitting behavior "X". In short, when a person competes with others, his behavior is a positive function of comparing his achievements with another's achievements.

Utilizing the functional definition provided above, this study will examine the effects of competitive contingencies, rewards contingent upon a comparison-outcome, on social comparisons, academic performance, and competitive behavior. Experiment I addresses the question: Will subjects beginning the series of investigations compare their performances and compete before competitive contingencies are introduced? Experiment II

addresses the questions: Will competitive contingencies promote subjects to compare the results of their behavior on an academic task? Will competitive contingencies promote subjects to increase the rate of response on the academic task? And will competitive contingencies promote competition on an academic task? Experiment III addresses the question: Will a greater reward for a comparison-outcome, a higher rate, promote social comparisons and competition in groups where a lesser reward had no effect.

Method

Group Composition

The subjects participating in the experiments ranged from 7 to 16 years. They were divided into three two-member groups. All subjects were enrolled in classes at the Experimental Education Unit of the Child Development and Mental Retardation Center at the University of Washington. S1, a boy age 7, and S2, a boy age 8, constituted Group 1. S3, a boy age 15, and S4, a girl age 16, constituted Group 2. S5, a boy age 15, and S6, a girl age 15, constituted Group 3.

Apparatus

The apparatus was situated on a square table 4' X 4'. The subjects sat at the table across from each other. The experimenter sat at a side table between them. In front of each subject were three counters, two of which were covered by lids. Readings could be taken from the counters by lifting the lids, which activated microswitches wired to an event recorder. The recorder tabulated lid lift frequencies during the experimental sessions. The third counter had no lid and tabulated the rewards received by the subject seated at that side of the table.

Also in front of the subjects was a pile of papers, letter-matching exercises, and a pencil. These exercise sheets consisted of four columns of letters, the rows numbered 1-15 on each sheet. The letter in the first column of a row must be matched by a letter in the remaining three columns of that same row. The matching identification was made by circling the appropriate letter. There were 15 matching problems on each sheet and all sheets were the same.

After completing a sheet, the subject placed it into a box adjacent to the experimenter's console and pushed a button in front of the box indicating that a sheet had been submitted. The experimenter, by looking through the transparent lid imprinted with the correct response pattern, could determine quickly if the sheet was free of errors. Error-free sheets constituted "correct academic responses" and sheets with one or more errors constituted "incorrect academic responses."

The experimenter's console, situated directly in front of the experimenter, consisted of six switches to operate the subject's counters, two switches to record any subject's errors, and two counters to tabulate the number of correct responses for each subject. A pair of crossing switches, situated at the ends of the console, enabled the experimenter to tabulate correct responses on both subjects' counters at once. An Esterline Angus twenty pen event recorder recorded the button presses, the lid lifts, and all switching activities from the experimenter's console. These data were printed on paper tape for a time-sequence analysis.

Experiment I: An Identification Procedure for Competition

Since one of the purposes of this research is to provide a means for identifying competition independently of rewards that may result from the

process, a brief description of the identification procedures is needed. Our definition of competition is a pattern of interaction in which the behavior of one person is a positive function of a comparison of the results of that behavior with the results of another's behavior. Our experimental situation provides the necessary components of this definition. The behaviors are academic responses, circling responses on letter-matching exercises, and the results to be compared are the numbers indicating correct responses that appear on the covered counters. A comparison may occur when Person lifts the lids of both counters, his and Other's, within five seconds of each other. Person is comparing his own results with Other's when his simultaneous lid lifts are a function of feedback, the information under the lids on Other's counter. Since a comparison of results is not possible if feedback about Other's results is cut off, there is no reason for Person to continue lifting Other's lid. Hence, if lid lifts are indicators of comparisons, simultaneous lid lifts should decrease during no feedback. In short, a comparison is identified when Person's lid lifts are a positive function of feedback on Other's counter. When feedback is present, simultaneous lid lifts increase and when feedback is absent, simultaneous lid lifts decrease.

Determining if Person is comparing his results with Other is the first step towards an identification of competition. Not only do competitors compare outcomes, but also they do something about this comparison, i.e., subsequent behavior is affected. In order to determine the effect of information about Other's performance on Person's behavior, feedback on Other's performance must be manipulated again. This time the dependent variable is academic behavior. During feedback, academic behavior must

increase and during no feedback decrease in order to complete the identification. In summary, then, competition can be identified when 1) simultaneous lid lifts are a positive function of feedback on Other's performance, and 2) academic behavior is a positive function of Other's performance.

In the present experiment all subjects were tested on items 1 and 2 above to determine if they were competing before competitive contingencies were introduced.

Procedure. The experiment was divided into four periods, baseline, feedback, no feedback, and feedback. During the baseline period the work-reward ratio was established for subsequent sessions. S1 and S2 received one minute of free time for every 4 correct academic responses, S3 and S4 received one minute of free time for every 30 correct academic responses, and S5 and S6 received one minute of free time for every 15 correct responses. The criterion for determining the ratio was the amount of work that would result in about 5 minutes of free time for a day's sessions, usually two consecutive 8-minute sessions. The experimental conditions were divided into 8-minute sessions, six sessions per condition. For groups 2 and 3 three consecutive sessions were conducted each day. Members in group 1 were younger and unable to work on the task more than two sessions per day.

The subjects were brought into the laboratory room and seated at the table supporting the experimental apparatus, the subject counters and the experimenter's console. The experimenter instructed the subjects on the letter-matching exercises; that they were to circle the letter in columns 2-4 that matched the letter in the first column. After completing each

sheet containing 15 such matching problems, Ss were instructed to place the sheets in the correction box and push the button in front of the box. The experimenter then lifted the lids of the counters one at a time, showing and instructing the subjects that one counter recorded "Self's" correct responses and the other counter recorded "Other's" correct responses. He also told the subjects that the third counter recorded the minutes of free time earned during the experiment.

During the session the experimenter looked at the submitted sheets through the transparent box lids imprinted with the correct response pattern. He corrected the sheets by pressing one switch for correct and another for an incorrect response for each sheet submitted. He pressed a third switch for every minute of free time earned. All switching operations were recorded on an event recorder.

During feedback conditions, all three counters for both subjects were in operation. During no feedback conditions, "Other's" counter was inoperable on both subjects' counter banks.

At the end of a day's sessions the experimenter counted the minutes of free time earned by the subjects and punched the appropriate number on a free-time card. Subjects took the free-time cards back to class with them. The instructors honored the cards by allowing subjects to spend the free time on activities of their choice.

Results. For three of the six subjects, S4, S5, and S6, simultaneous lid lifts and academic response rates were the same during feedback and no feedback conditions, suggesting that the three subjects were not competing. For two subjects, S2 and S3, simultaneous lid lift frequencies were a function of feedback but academic responses were not. The two subjects

were comparing their performance with their partners', but their subsequent behavior was unaffected by the information obtained, i.e., they were not competing.

Figures 1 and 2 present data for S2 and S3 respectively. Each figure is divided into two parts, the upper half representing lid lift rates and the lower half representing academic response rates. The average rates for simultaneous lid lifts for S2 during the three conditions -- feedback, no feedback, and feedback -- were .31, .09, and .20; and for S3 .28, .10, and .20. However, the average rates for correct academic responses for S2 during the three conditions were 2.20, 3.17, and 4.79; and for S3, 5.92, 5.87, and 6.55. Lid lifts were a function of feedback but academic responses were not for both S2 and S3.

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Insert Figures 1 & 2 about here

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For one subject, S1, both lid lift rates and academic performance rates were a positive function of feedback. Figure 3 presents data for this subject. The average rates for simultaneous lid lifts during the three periods -- feedback, no feedback, feedback -- were .53, .36, and .55. The average rates for correct academic responses were 1.41, .93, and 1.61. Simultaneous lid lifts were a positive function of the feedback presented on Other's counter, suggesting that S1 was comparing his results with Other. S1's performance was also affected by this information. When information was available, feedback conditions, his behavior increased and when it was not available, his behavior decreased. S1 was competing.

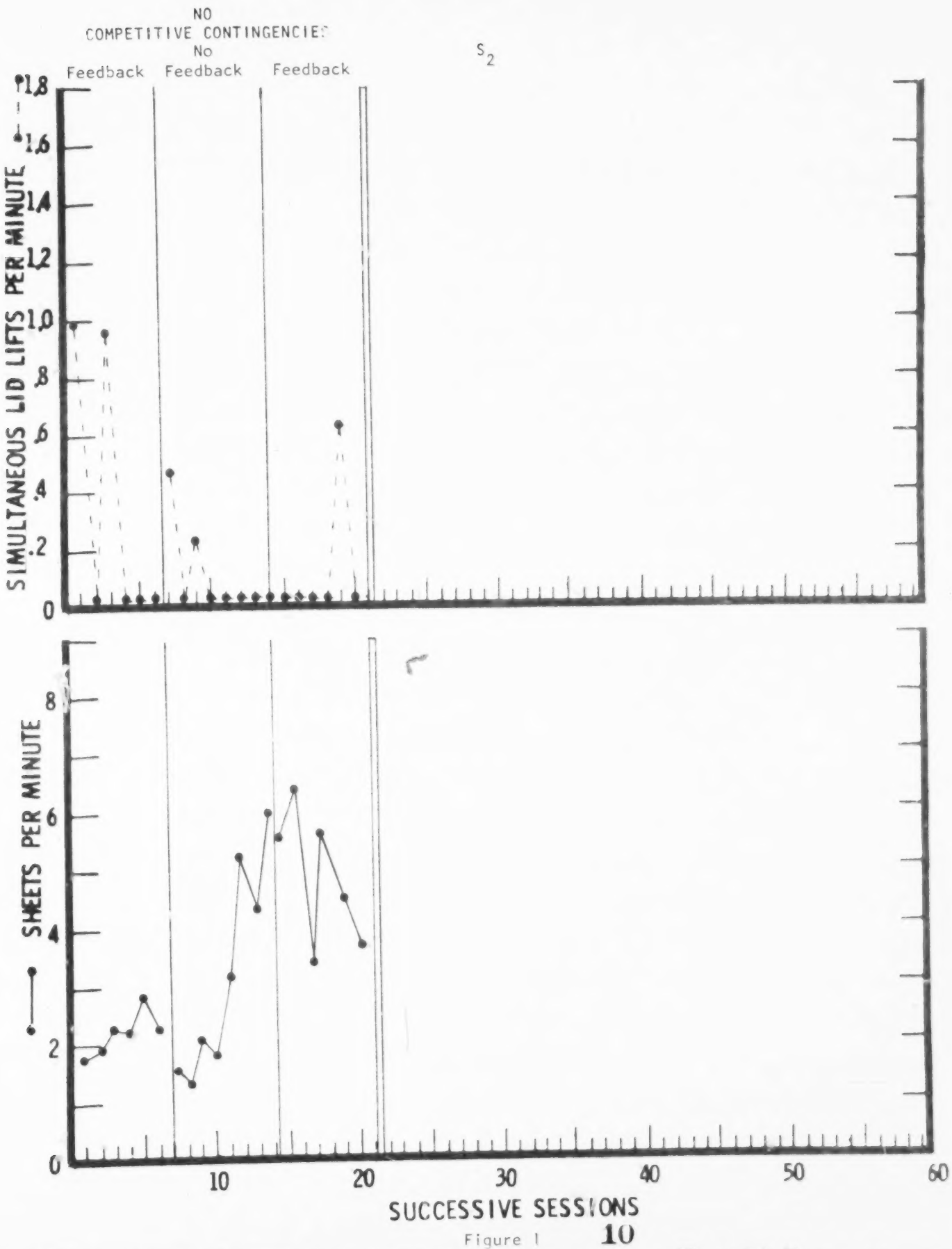
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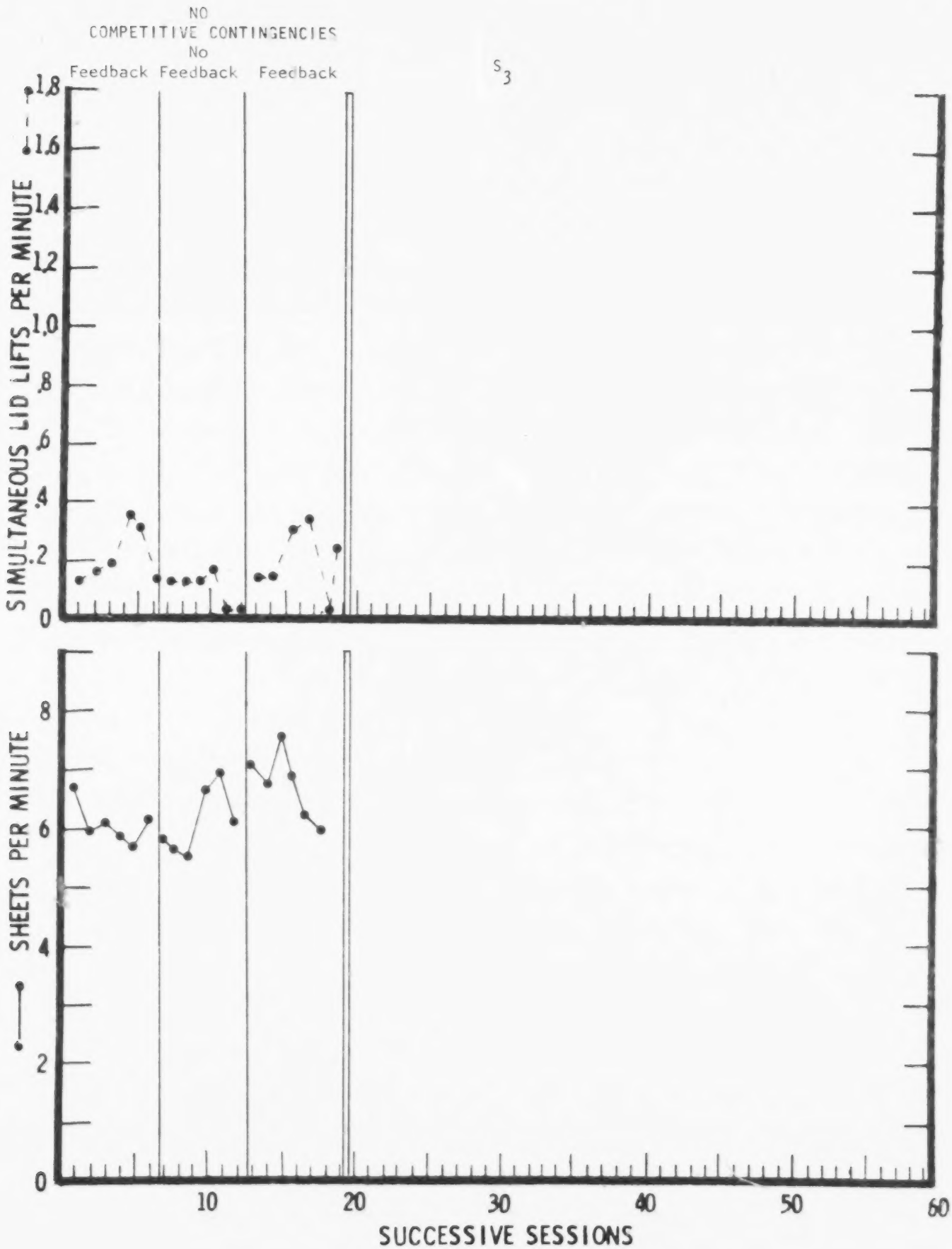
Figure 1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SUCCESSIVE SESSIONS

Figure 2

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Insert Figure 3 about here

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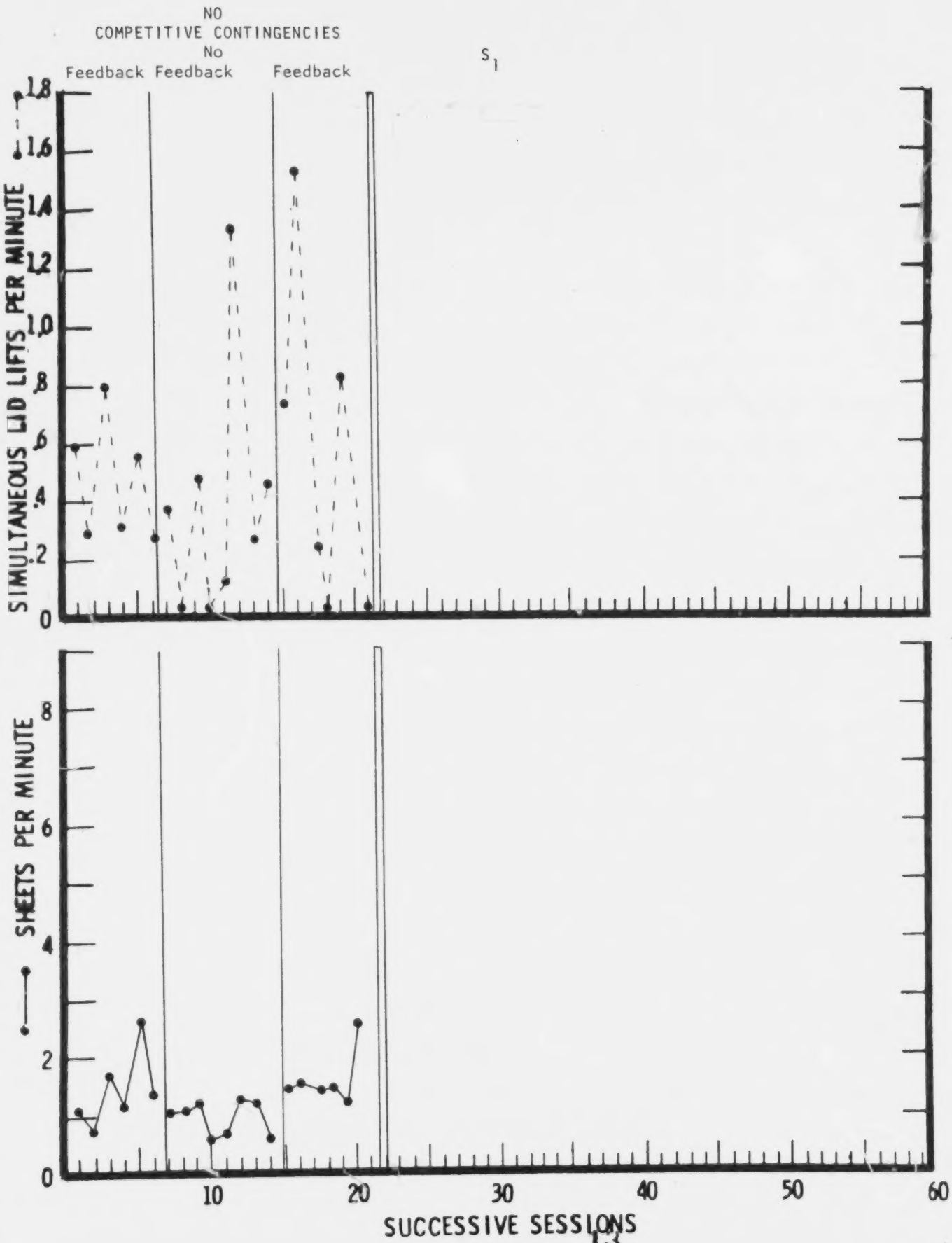
Experiment II: The Effects of Competitive Contingencies on Social Comparisons, Academic Performance and Competition

The purpose of Experiment I was to determine if subjects were comparing results and competing prior to an introduction of the independent variable of this study, competitive contingencies. Data from that experiment indicated that three of the six subjects did not compare results and did not compete. Two compared but did not compete and one compared and competed. The purpose of Experiment II is to determine the effects of competitive contingencies, rewards for producing a higher academic rate on social comparisons, academic performance, and competition.

Procedure. The general procedures of Experiment I were repeated in Experiment II with the following alterations. The experimenter instructed the subjects that the person with the most sheets completed correctly would be identified at the end of each session with a white tab placed on his correction box. Whoever received the most tabs at the end of the day's sessions would receive one extra minute of free time, the competitive contingent reward.

These competitive contingencies were in operation for 18 sessions. During the feedback periods, the first and third 6 sessions, all counters operated, and information about who produced more correct sheets during each session was provided, i.e., tabs were placed on correction boxes at the end of the sessions. During no feedback periods, the second 6 sessions,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SUCCESSIVE SESSIONS

Figure 3

Other's counter was inoperable and tabs were not provided. Information on who was ahead was not available to the subjects. The competitive contingent reward, one extra minute of free time for the subject with the most sheets, was provided at the end of a day's session.

Following the 18 sessions of competitive contingencies -- 6 for feedback, 6 for no feedback, and 6 for feedback -- the extra minute of free time for producing a higher rate was not provided for 18 more sessions of feedback-no feedback-feedback. Combining data from this experiment with data from Experiment I produces three contingency conditions: 18 sessions of noncompetitive contingencies, 18 sessions of competitive contingencies, and 18 sessions of noncompetitive contingencies again. The A-B-A format provides an opportunity to examine the effects of competitive contingencies on comparisons, academic performance, and competition.

Results I - The effects of competitive contingencies on social Comparisons Experiment I demonstrated that three of the six subjects, S1, S2, and S3, made comparisons before competitive contingencies were introduced. In this experiment they continued to make comparisons. In addition, results from this experiment indicate that S4, S5, and S6 began making comparisons during competitive contingencies.

Figures 4, 5, and 6 present data for S4, S5, and S6 respectively. For these subjects lid lift rates are higher during CC, competitive contingencies, than during Non-CC. By blotting out the first two experimental periods, feedback and no feedback, for all three contingency conditions, no-cc, cc, no-cc, the higher rates during CC can be easily identified by comparing rates during the last feedback periods.

Also, lid lifts were a function of feedback during the competitive contingent condition, indicating that subjects were comparing each other's results. Figures 7 8, and 9 present the lid lift data for this contingency condition. The preceding and succeeding Non-CC conditions are blotted out for a clearer presentation. During CC the lid lift rates of S4 for feedback-no feedback-feedback periods were .30, 0.0, .49; S5: .15, .05, .11; and S6: .14, .04, and .15. The competitive contingent condition produced social comparisons in three of the six subjects who previously had not compared performances.

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Insert Figures 4-9 about here

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Results II - The effects of competitive contingencies on academic performance In addition to promoting social comparisons and causing behavior to become a function of t se comparisons, competitive contingencies may produce higher rates of academic performance. Figures 10, 11, and 12 indicate that the performance of three subjects, S1, S2, and S6 increased when CC was introduced and decreased when it was discontinued. Again, the first two sessions of each contingency condition are blotted out so that the rates during the last feedback period of each contingency condition may be easily compared. The average rates for these last feedback periods of no CC-CC-no CC for S1 are: 1.61, 6.07,

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Insert Figures 10-12 about here

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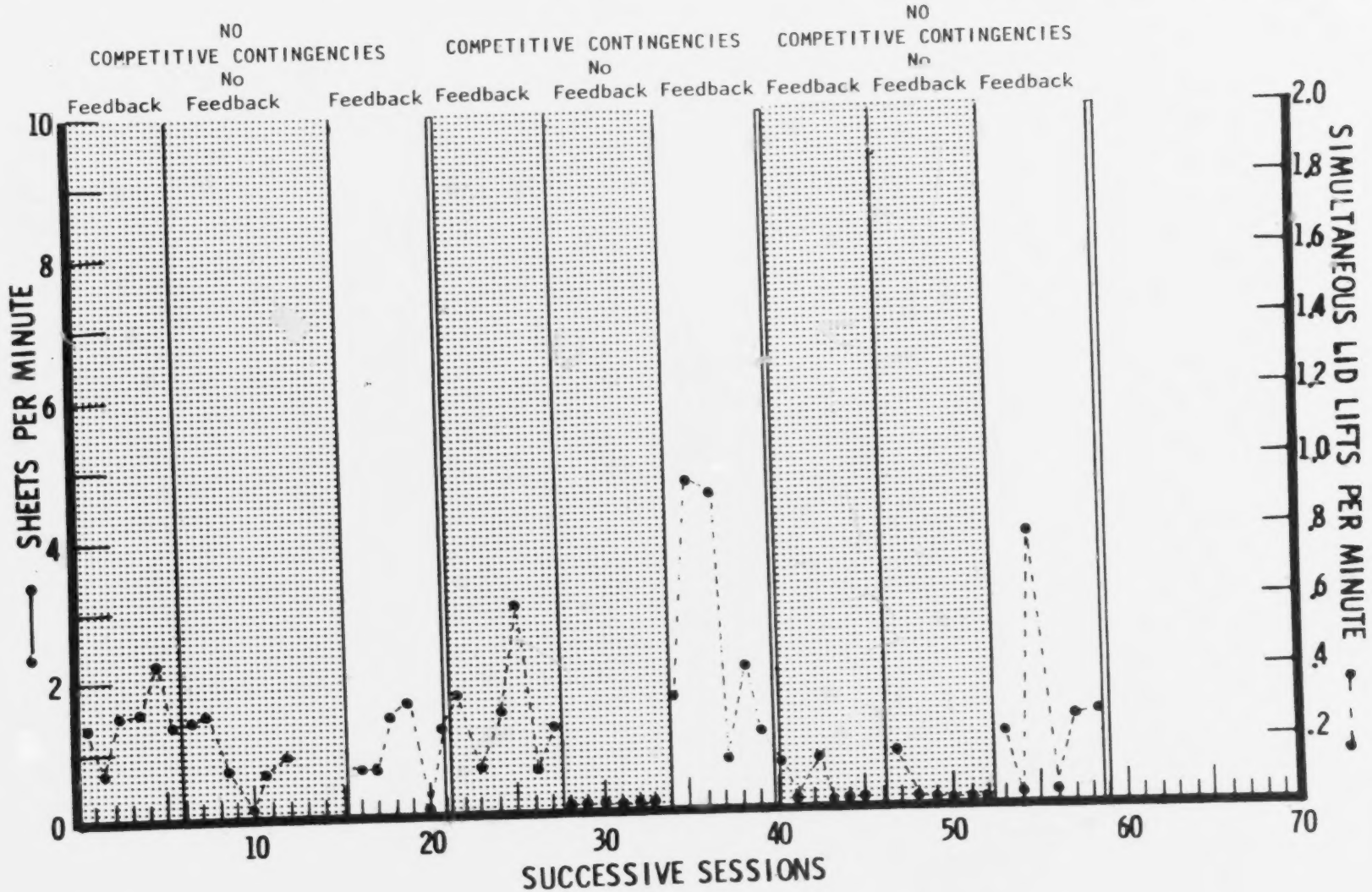
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Figure 4

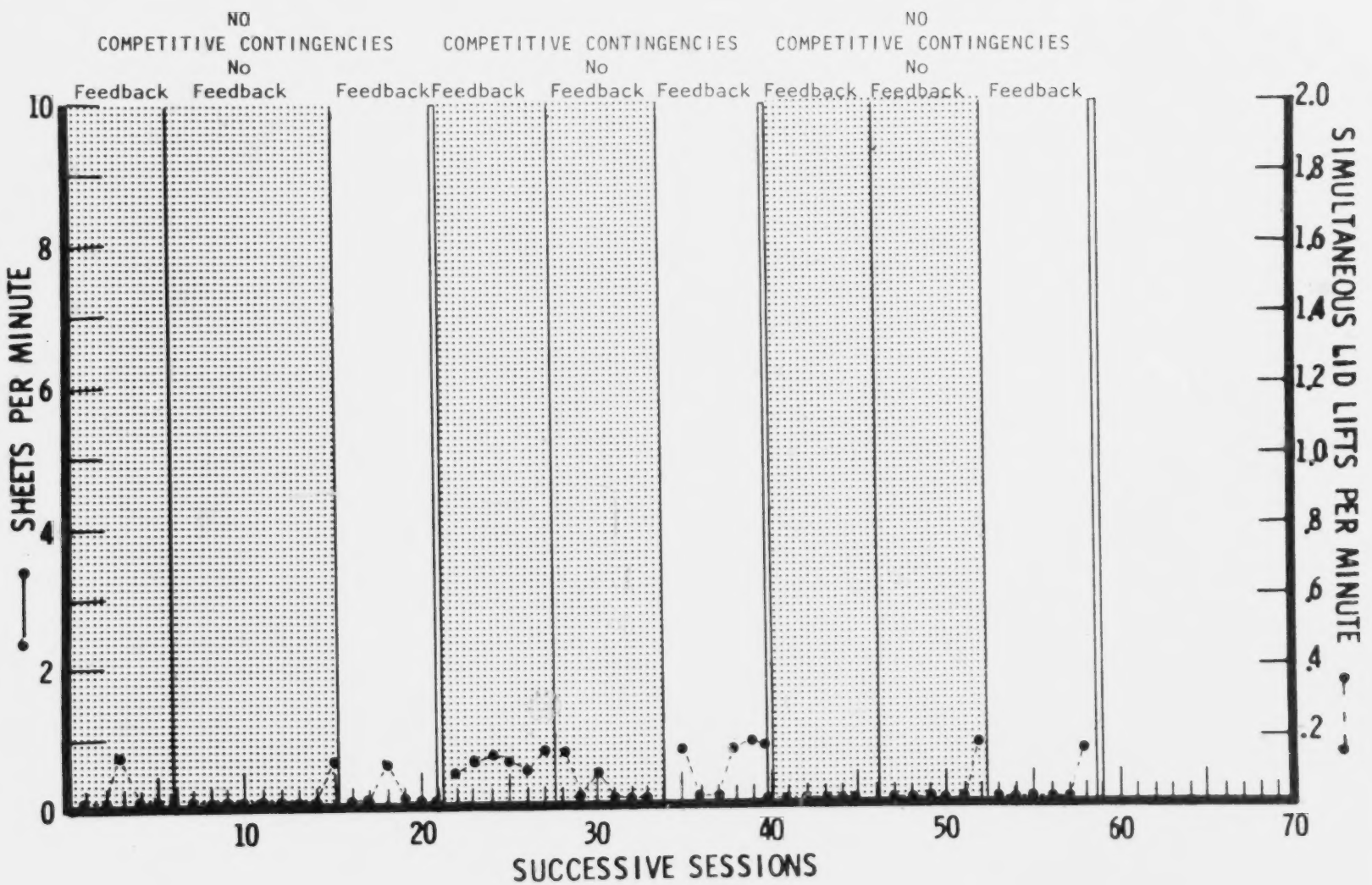
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Figure 5

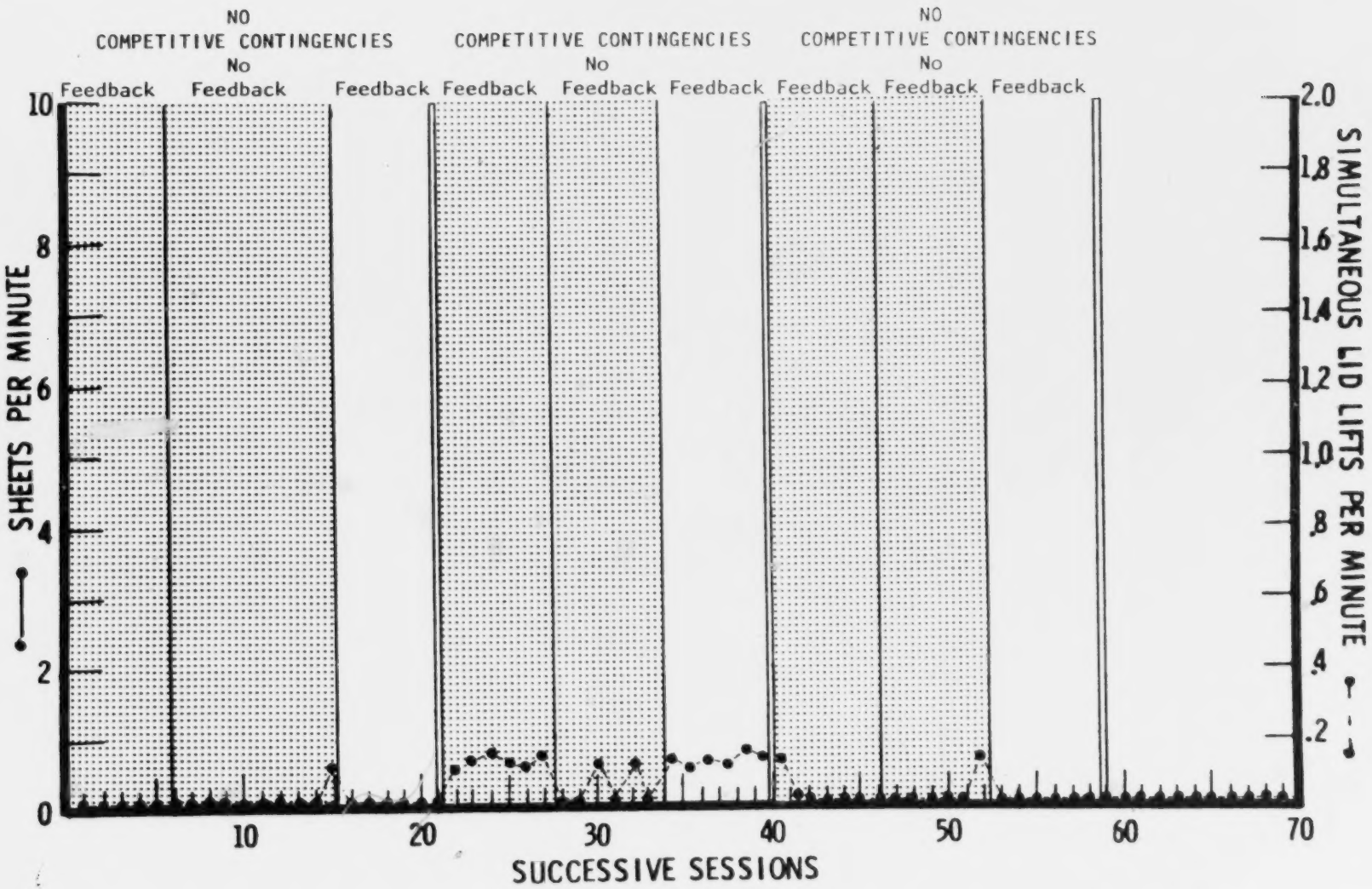
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Figure 6

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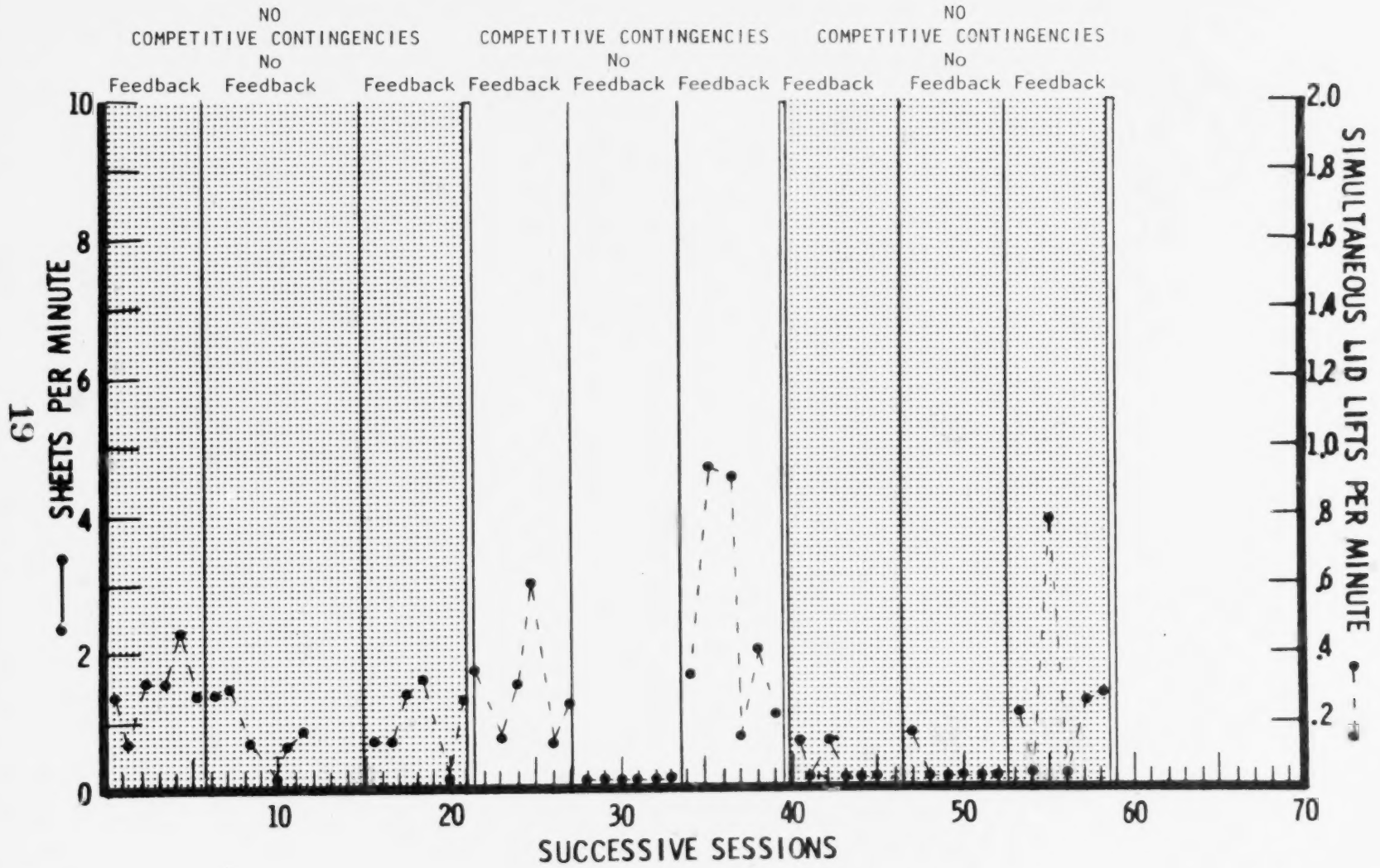
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Figure 7

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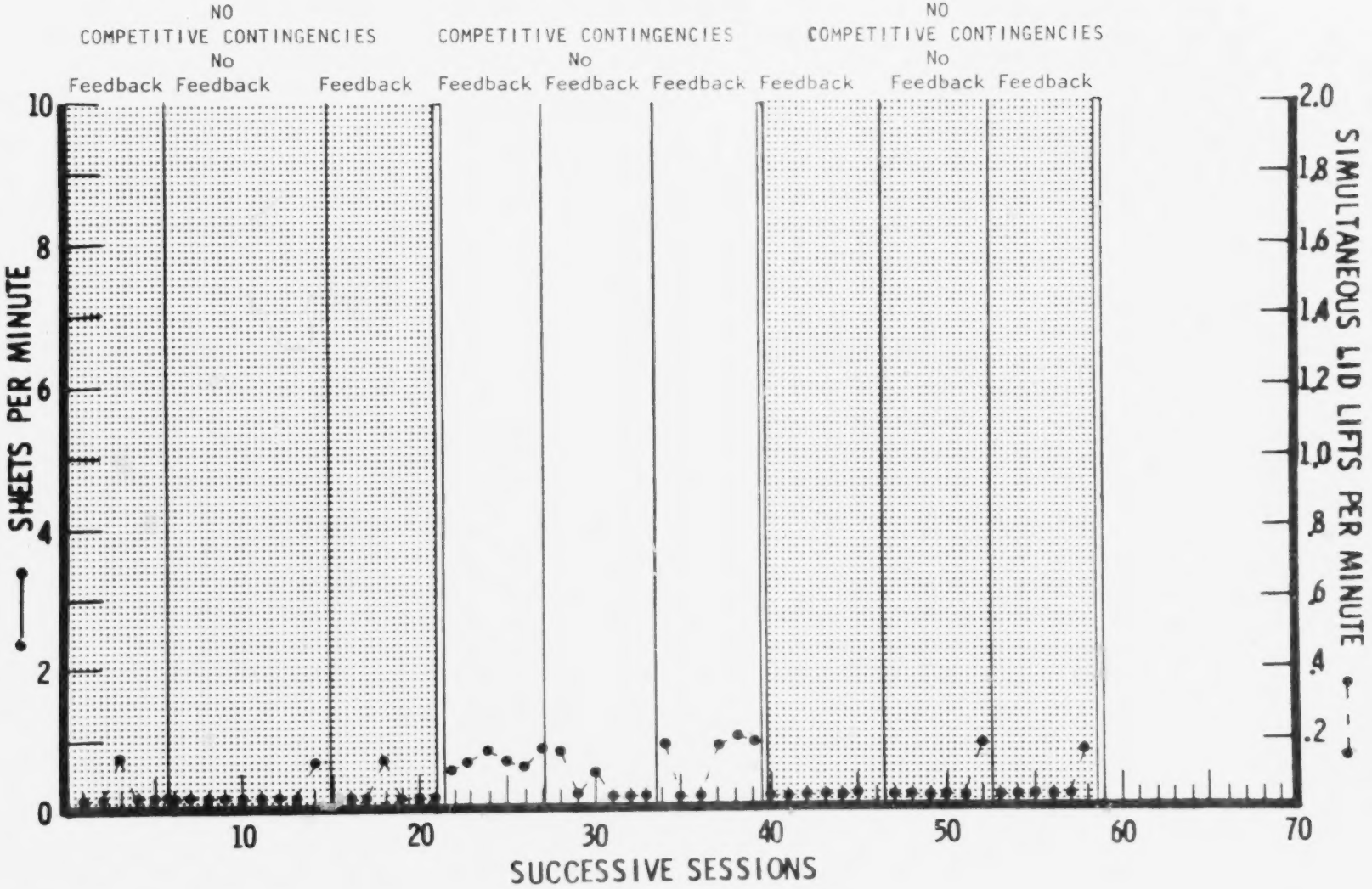
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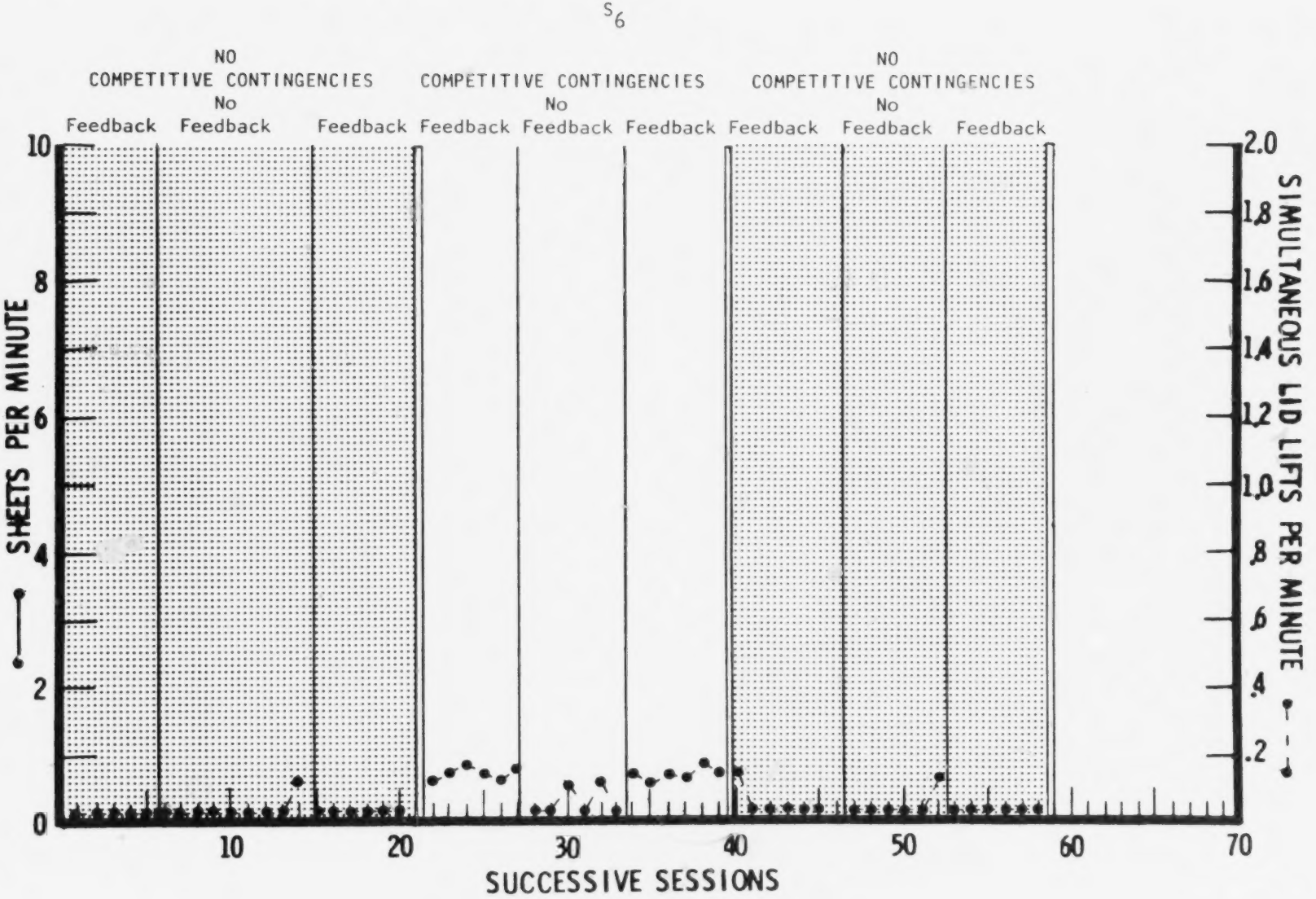
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Figure 9

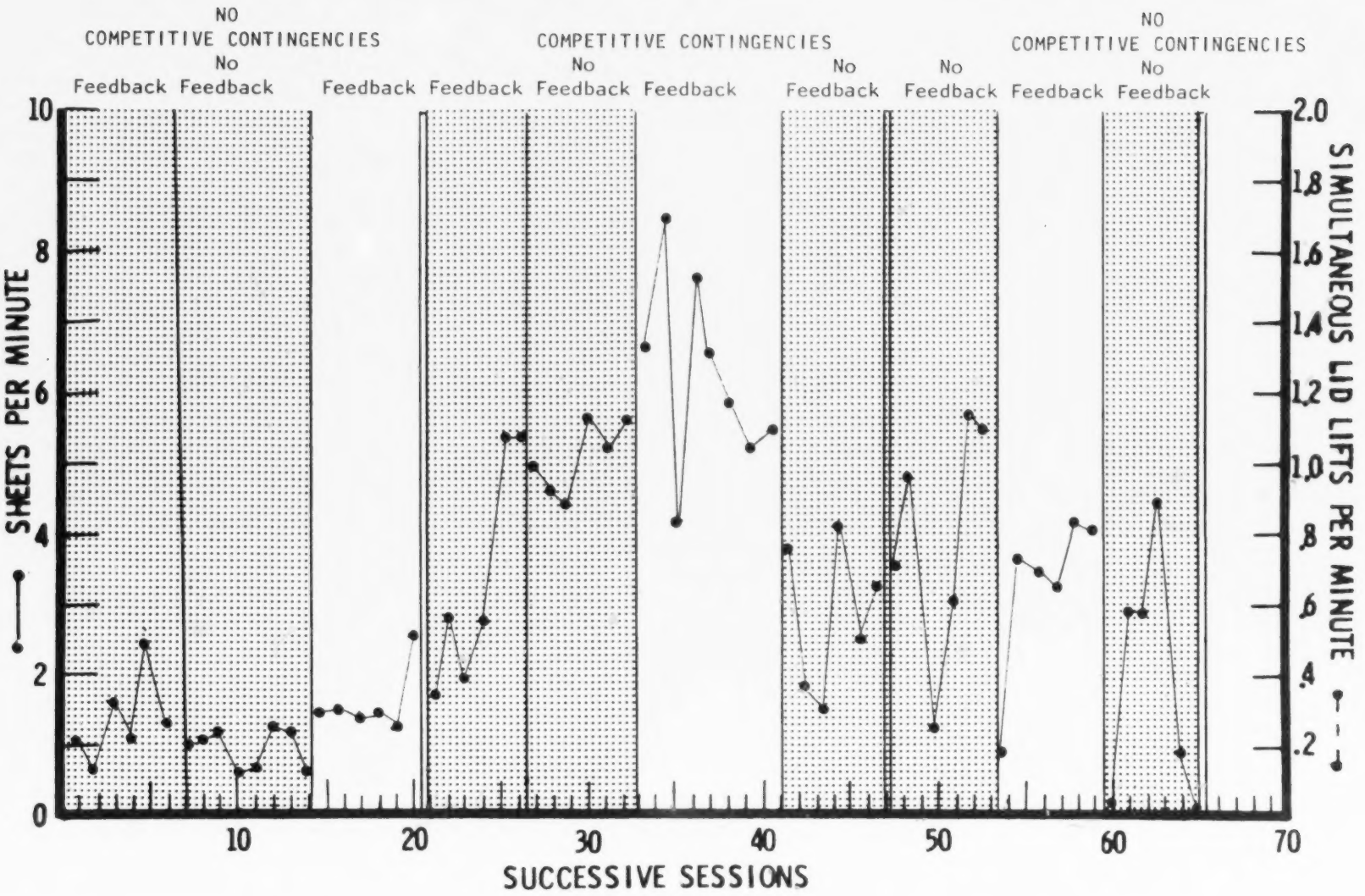
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Figure 10

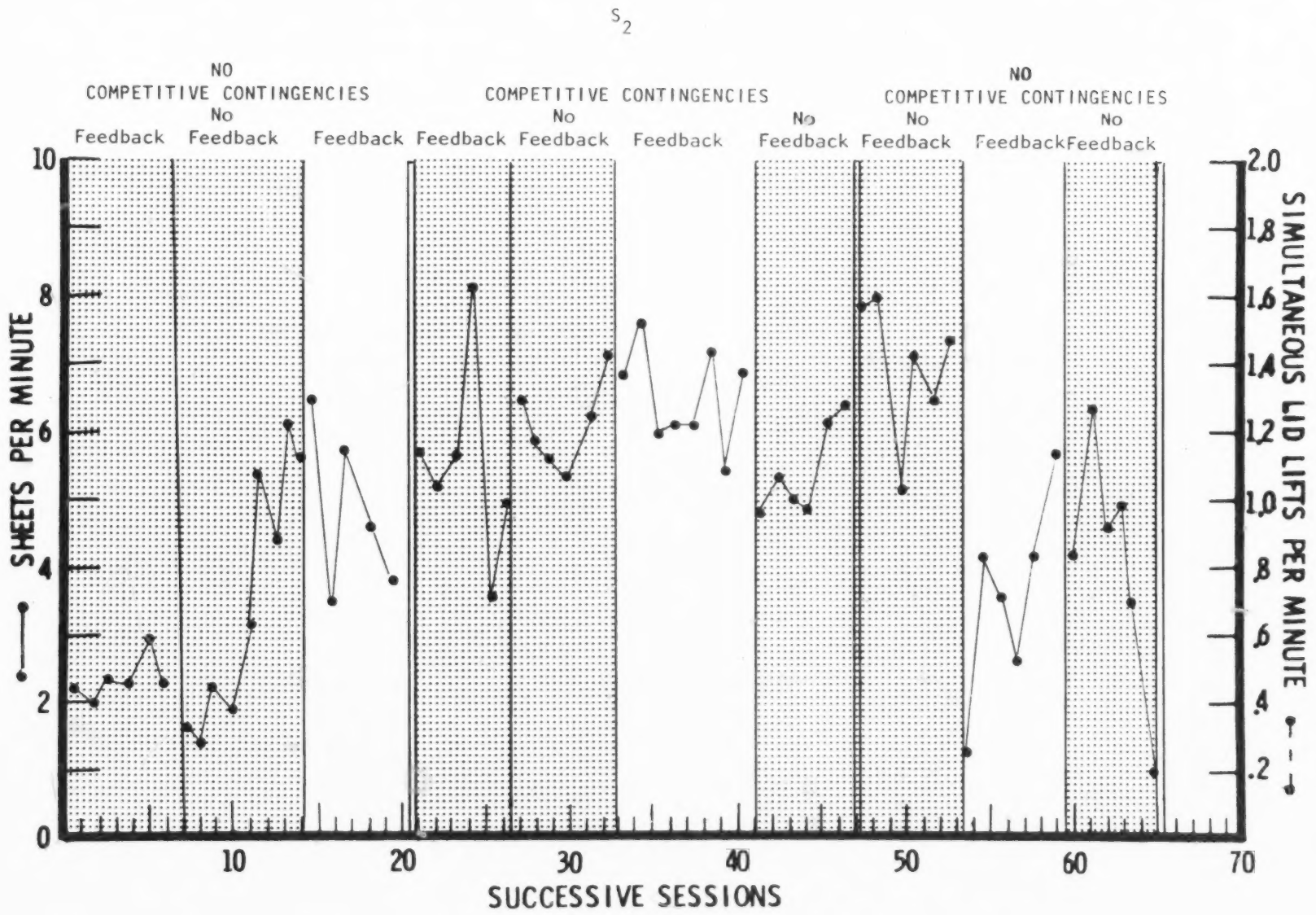
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Figure 11

S_6

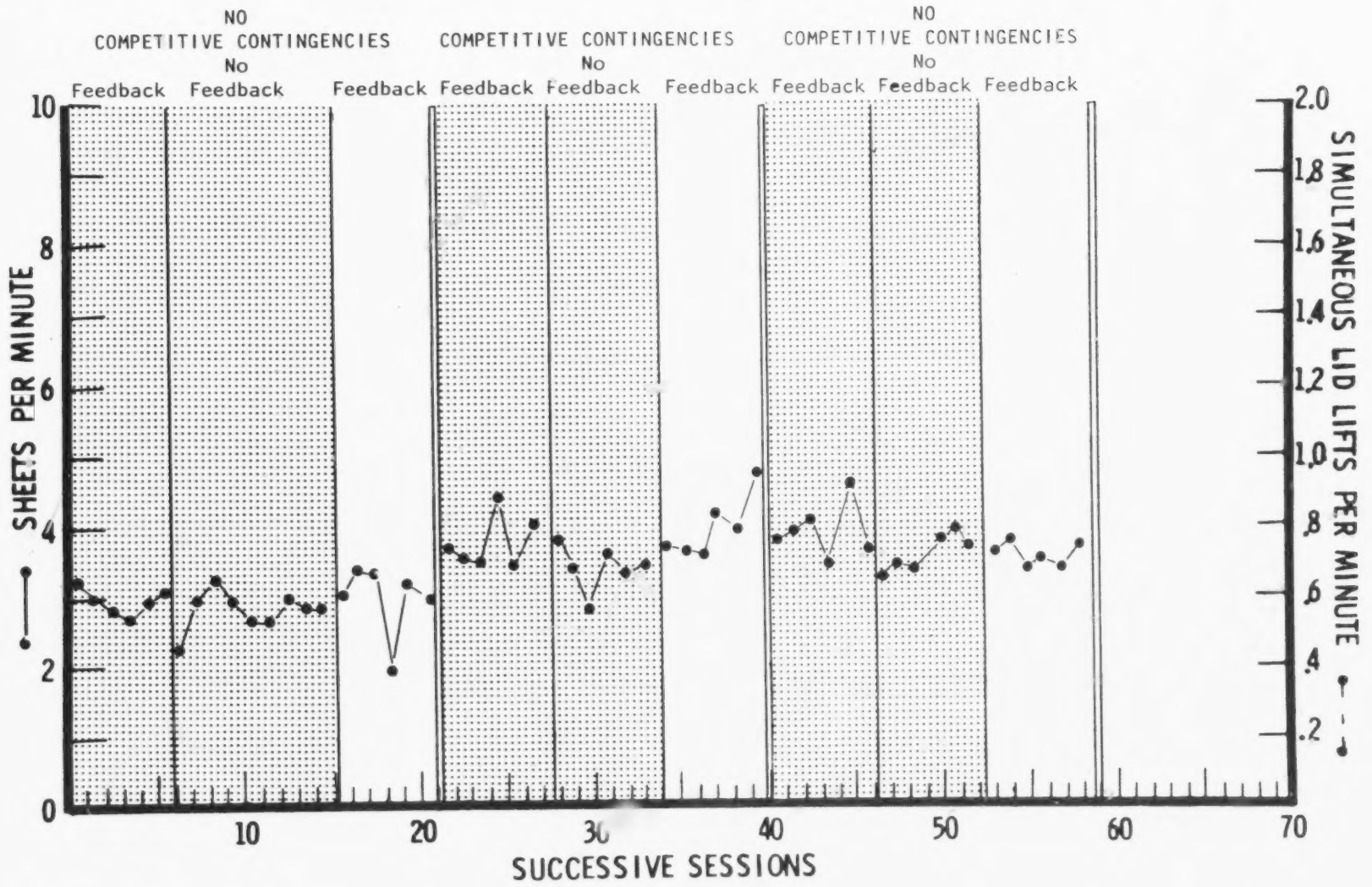
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Figure 12

and 3.19; for S2: 4.79, 6.42, and 3.50; and for S6: 2.91, 3.87, and 3.43. Academic performance appears to be a function of the competitive contingent condition for S1, S2, and S6.

Results III - The effects of competitive contingencies on competition

The effects of competitive contingencies on competition can be demonstrated (1) if competition is absent before competitive contingencies are introduced, if competition is present during competitive contingencies, and if competition is absent when competitive contingencies are discontinued; or (2) if competition occurs at higher rates during competitive contingencies than during non-competitive contingencies. If (1) occurs, the conclusion to be drawn is that competitive contingencies produced competition, and if (2) occurs, the conclusion is that competitive contingencies increase the rate of competitive behavior.

Data from the present experiment indicate that competition was affected by the experimental manipulations of Experiment II in three of the six subjects, S1, S2, and S6. For S1 and S2 academic performance increased steadily during the first two periods of feedback and no feedback for the competitive competitive condition, preventing a clear interpretation of the data. Consequently an additional no feedback period was conducted to demonstrate that performance was a function of feedback. The CC condition for these two Ss, then, is composed of four rather than three feedback periods: feedback, no feedback, feedback, and no feedback again. We look to the last three feedback periods for our inferences.

Figures 13 and 14 present data for S2. Although S2's simultaneous lid lifts were a function of feedback for both Non-CC and CC conditions,

Figure 13 (lid lift rates are greater during feedback than during non-feedback periods for all contingency conditions), his academic behavior was a function of feedback only during the competitive contingency condition. In Figure 14 the preceding and succeeding non-competitive contingencies are blotted out allowing clearer focus on the CC condition. The data, then, suggest that S2 was competing only during the CC condition, since here both academic and lid lift rates were a function of feedback.

- - - - - - - - - - - - - - - -

Insert Figures 13 & 14 about here

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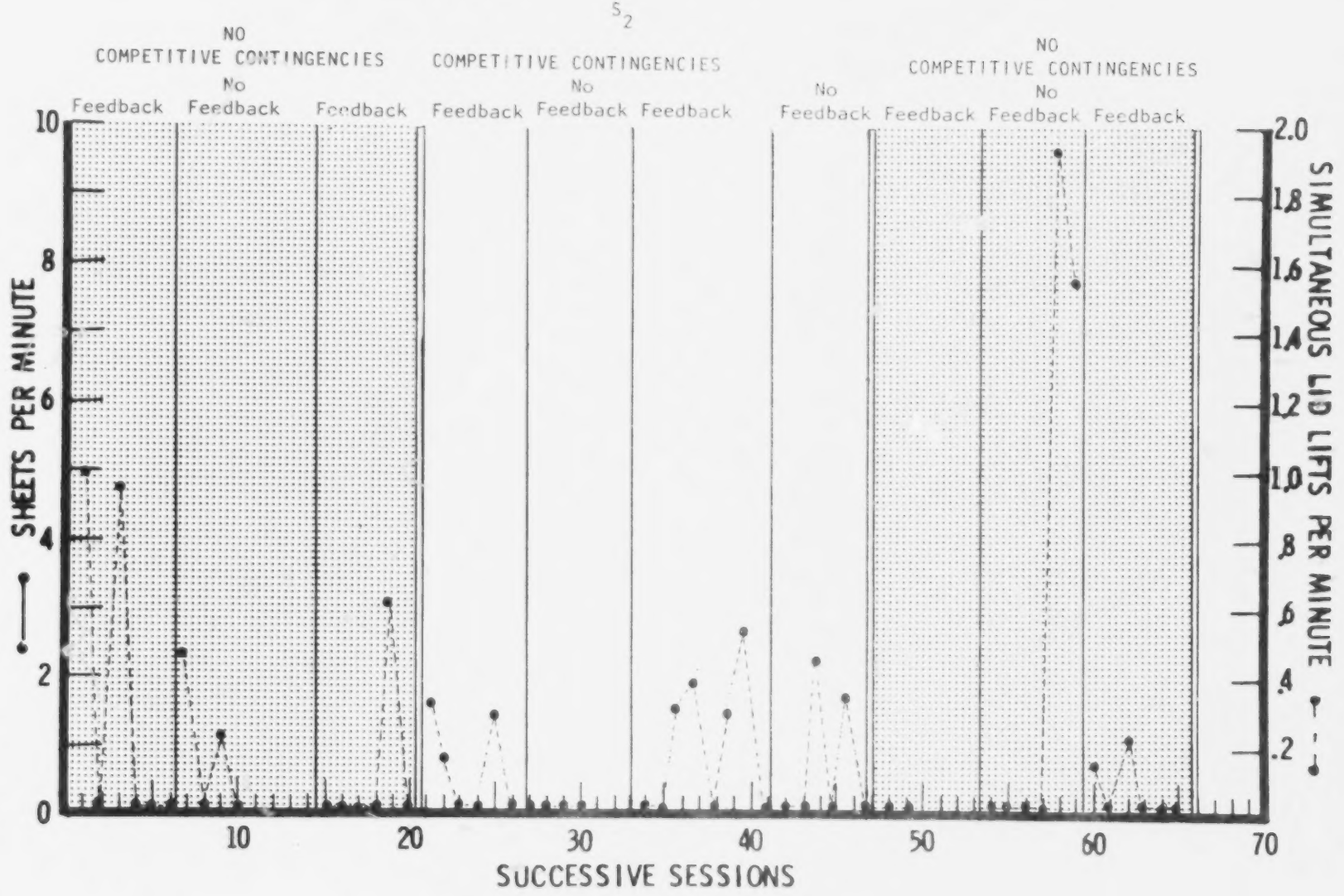
Figure 15 presents data for S1. The figure is divided into two parts, the upper half representing lid lifts and the lower half representing academic response rates. The data in Figure 15 indicate that both academic response rates and lid lift rates are higher during feedback than non-feedback periods for all contingency conditions. However, the rate of academic performance during CC conditions was higher than the Non-CC conditions. The effect of competitive contingencies was to increase the rate of competitive responses for S1.

Figure 16 presents data for S6. Again the figure is divided into two parts, the upper half representing lid lifts and the lower half representing academic response rates. The data indicate that both academic response rates and lid lift rates are a function of feedback only during the CC conditions. During CC S6's average academic rates for feedback, no-feedback, feedback are: 3.68, 3.32, and 3.87. His average lid lift rates for feedback, no feedback, feedback periods are: .14, .04, and .15.


S2
NO
COMPETITIVE CONTINGENCIES
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COMPETITIVE CONTINGENCIES
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Feedback
Feedback
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Feedback
Feedback
SHEETS PER MINUTE
SIMULTANEOUS LID LIFTS PER MINUTE
SUCCESSIVE SESSIONS
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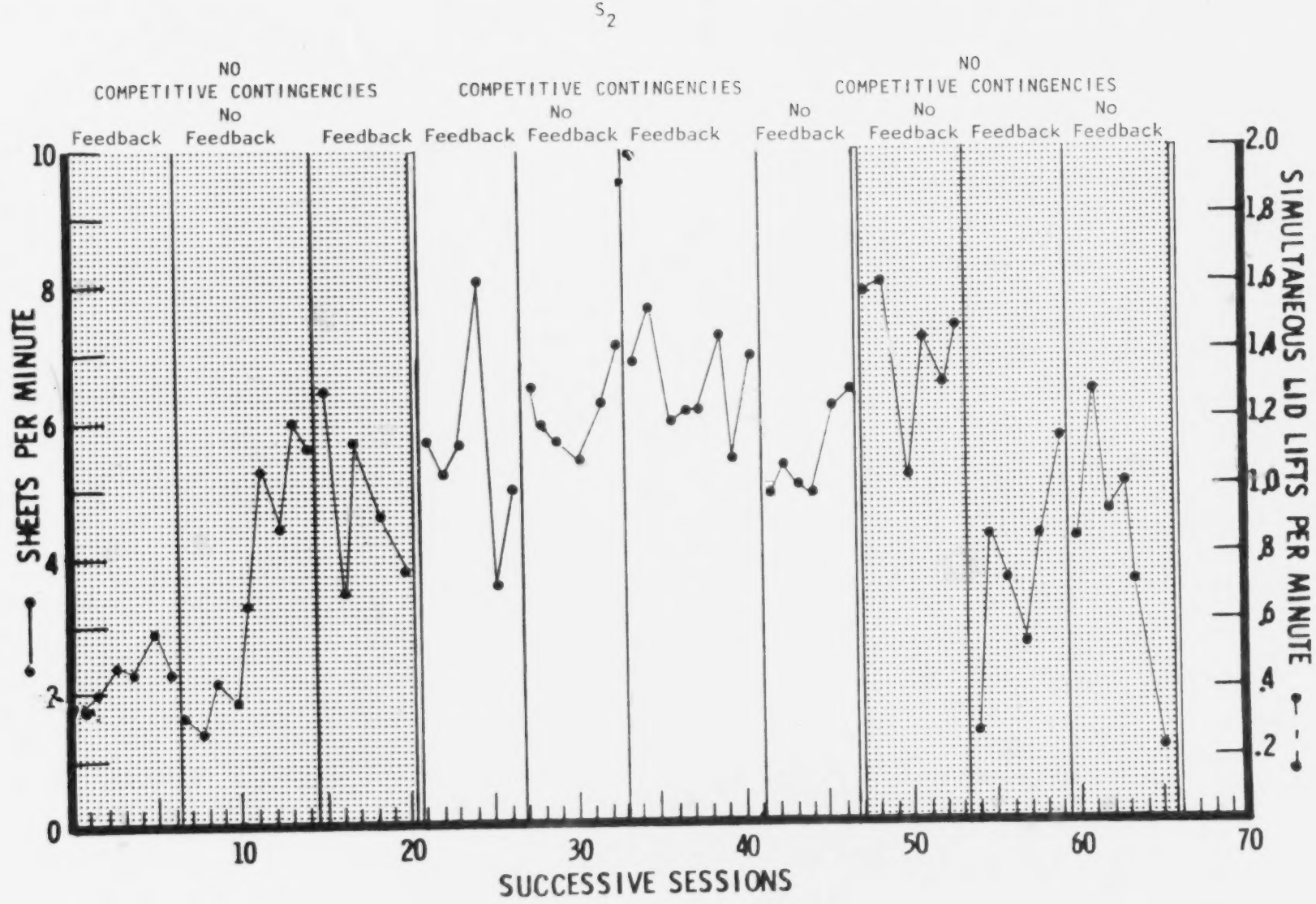
Figure 13


S2
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COMPETITIVE CONTINGENCIES
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Feedback
Feedback
COMPETITIVE CONTINGENCIES
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Feedback
Feedback
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COMPETITIVE CONTINGENCIES
No
Feedback
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No
Feedback
SHEETS PER MINUTE
SIMULTANEOUS LID LIFTS PER MINUTE
SUCCESSIVE SESSIONS
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Figure 14

The differences between feedback periods for the academic rates are much smaller for this subject than for S1 or S2. For this reason, S6 will participate in Experiment III which is designed to produce competition in those subjects who did not compete in Experiment II. It will be interesting to note if S6 continues to compete in Experiment III and if the differences between conditions increase.

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Insert Figures 15 & 16 about here

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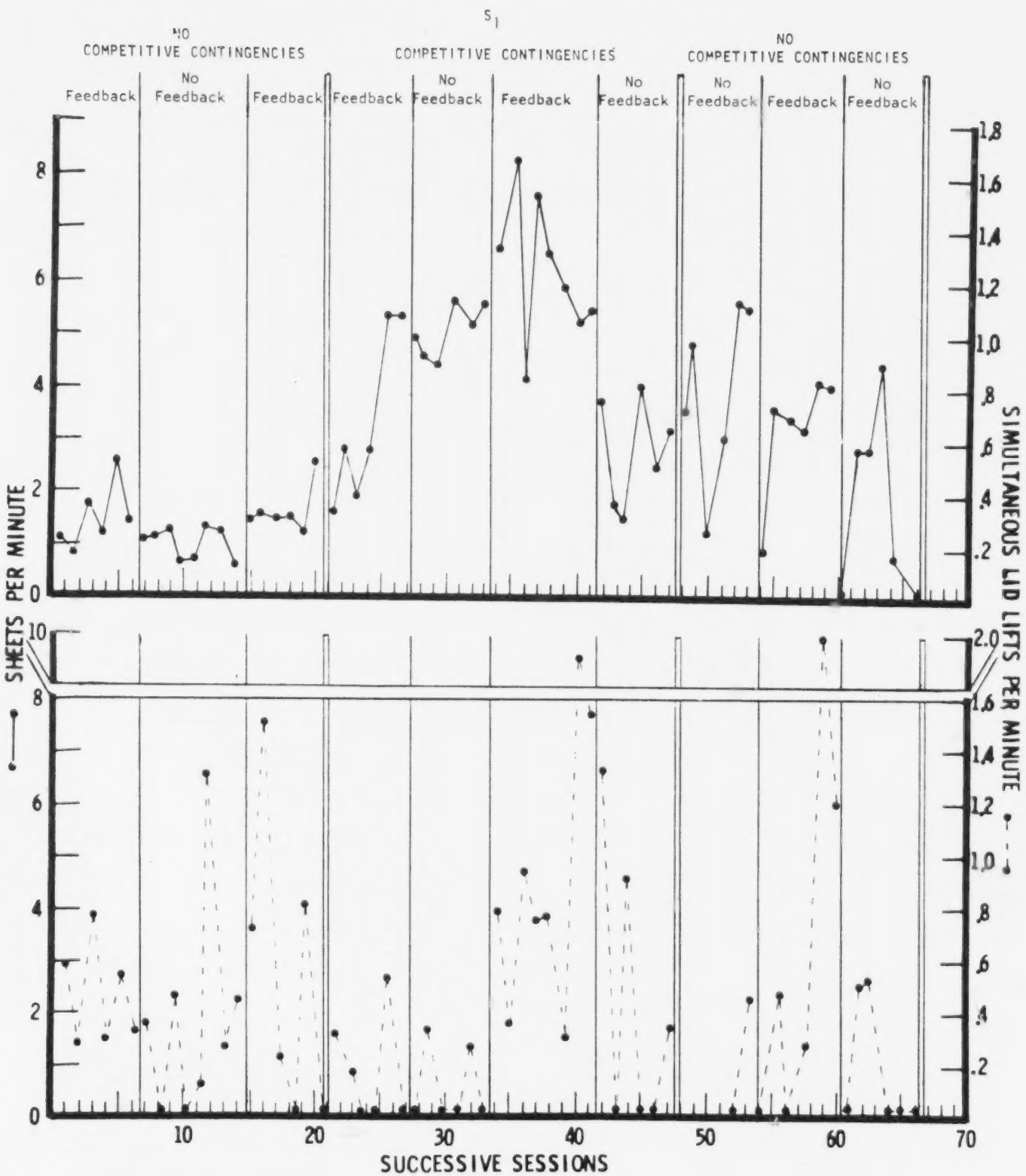
Discussion of Experiments I and II

Experiment I provided a method for identifying competition and a baseline on social comparisons, academic performance, and competition so that the effects of competitive contingencies introduced in Experiment II might be evaluated. Data from Experiment I indicated that S1, S2, and S3 made social comparisons with their partners at the outset of the sessions. S4, S5, and S6, however, did not. Only one subject, S1, began the sessions competing. Both his academic behavior and his simultaneous lid lifts were a function of feedback.

Experiment II provided information about the effects of competitive contingencies on promoting social comparisons, academic performance and competition. CC promoted social comparisons in the three subjects, S4, S5, and S6, who previously did not compare. Experiment II also demonstrated that S1, S2, and S6's academic performance was a function of competitive contingencies. However, the remaining three Ss -- S3, S4, and S5 -- showed no increase in performance with an introduction of CC nor a decrease in performance when CC were discontinued.


S1
NO COMPETITIVE CONTINGENCIES
COMPETITIVE CONTINGENCIES
NO COMPETITIVE CONTINGENCIES
Feedback
No Feedback
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No Feedback
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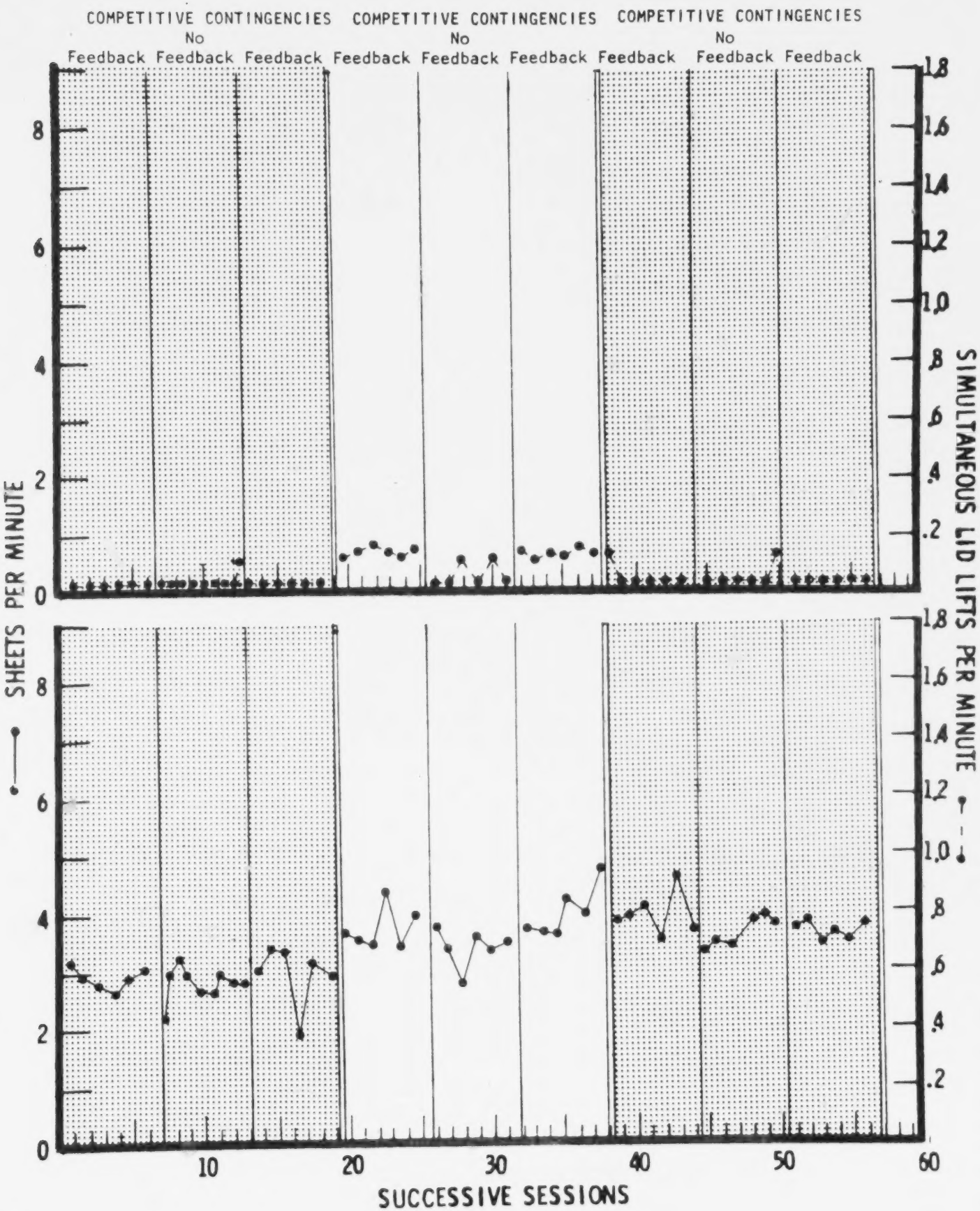
No Feedback
SHEETS PER MINUTE
SIMULTANEOUS LID LIFTS PER MINUTE
SUCCESSIVE SESSIONS

Figure 15


COMPETITIVE CONTINGENCIES
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COMPETITIVE CONTINGENCIES
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SHEETS PER MINUTE
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SUCCESSIVE SESSIONS

Figure 16

Results for Experiment II also suggested that three of the six subjects competed during the competitive contingent condition. Two subjects, S2 and S6, began competing and one subject, S1, increased his rate of competitive responses. The differences in academic performance rates during feedback periods were less dramatic for S6 than for S1 and S2. S6 will be included in Experiment III.

In summary, these data suggest that the competitive contingencies as arranged in Experiment II have not been entirely effective. Although CC conditions produced social comparisons in the subjects previously making no comparisons (S4, S5, and S6), the academic performance rates of S3, S4, and S5 did not increase nor did S3, S4, or S5 compete during CC. Experiment III investigates the effects of another competitive contingency on academic performance and competition for S3, S4, S5, and S6.

Experiment III: The Effects of the Amount of Competitive Contingent Reward on Academic Performance and Competition

Procedure. During competitive contingent conditions of the previous experiment, subjects were instructed that the person completing the most sheets correctly would be identified at the end of each session by a white tab placed on his correction box. Whoever received the most tabs at the end of the day's sessions would receive one extra minute of free time. The only alteration in this procedure for the present experiment was a change in the amount of extra free time. Instead of one minute extra, subjects receiving the most tabs at the end of the day's sessions would receive 10 minutes extra free time. S3, S4, S5, and S6 participated in this experiment.

The experiment began with a non-competitive contingent condition. During this condition feedback-no feedback-feedback periods were manipulated to determine if simultaneous lid lifts and academic performance were a function of feedback. The competitive contingent condition followed, also with the appropriate feedback, no feedback, feedback manipulations. The experiment ended with the original non-competitive contingent condition.

Results I - The amount of competitive contingent reward on academic performance Data for S3, S4, S5 and S6 are presented in Figures 17-20. For 3 of the 4 subjects (S3, S4, and S6) the performance rates increased during CC and decreased when the contingencies were discontinued. The average rates of performance for S3, during the last feedback period of no CC-CC-No CC were: 1.74, 2.41, and 1.85; for S4: 3.38, 5.03, and 3.46; for S6: 3.43, 4.05, and 3.72. The academic performance rate for S5 increased with an introduction of competitive contingencies, but did not decrease when the condition was subsequently discontinued. The average rates for S5 during the last feedback conditions of CC-noCC-CC were 4.33, 4.67, and 4.99.

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Insert Figures 17-20 about here

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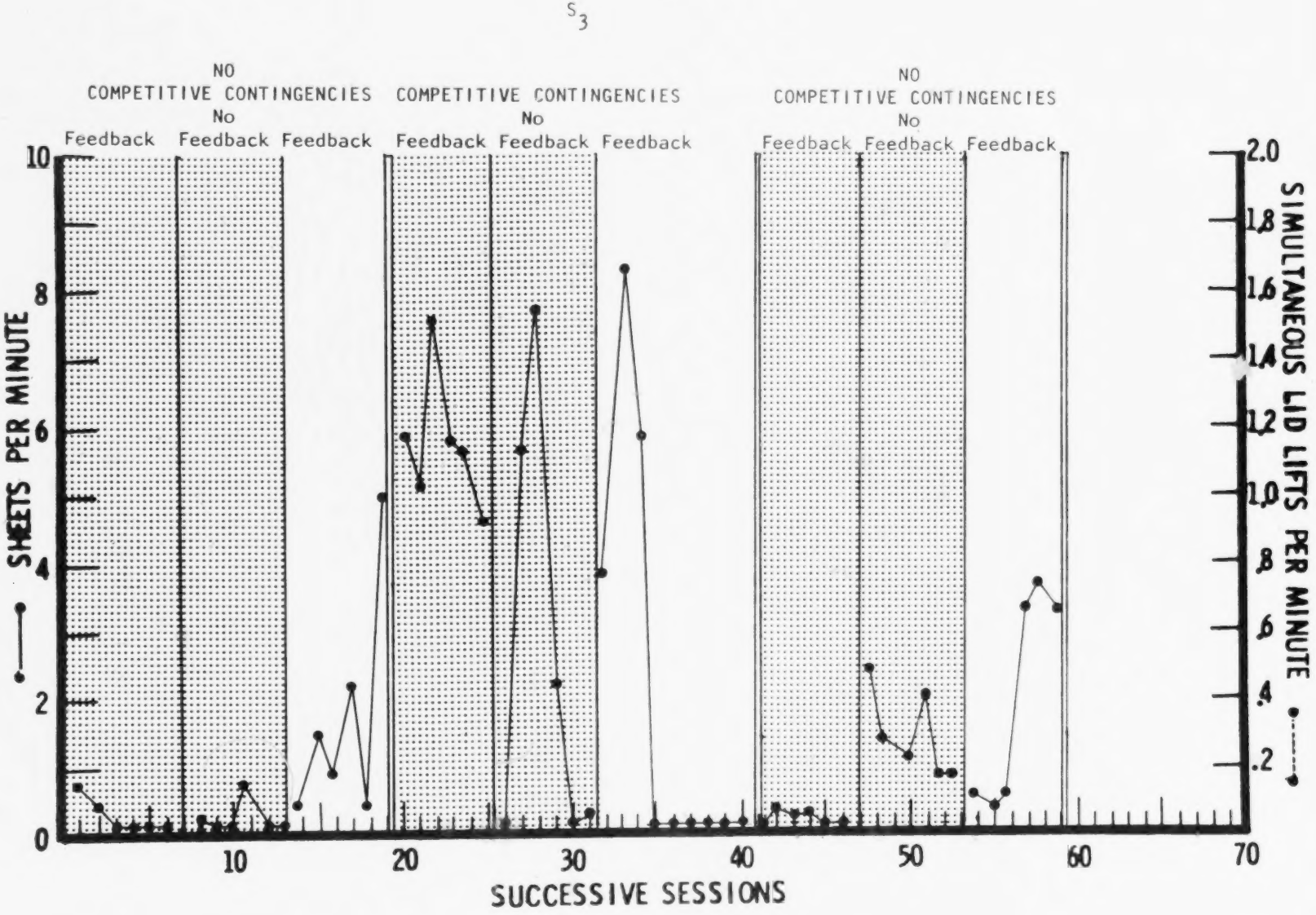
Results II - The effects of competitive contingent reward on competition Data for S3, S4, S5, and S6 are presented in Figures 21-24. On each figure are two graphs, one showing simultaneous lid lifts (upper graph) and the other showing academic behavior (lower graph). For S4, S5,


S3
NO
COMPETITIVE CONTINGENCIES
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Feedback
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COMPETITIVE CONTINGENCIES
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COMPETITIVE CONTINGENCIES
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SIMULTANEOUS LID LIFTS PER MINUTE
SUCCESSIVE SESSIONS
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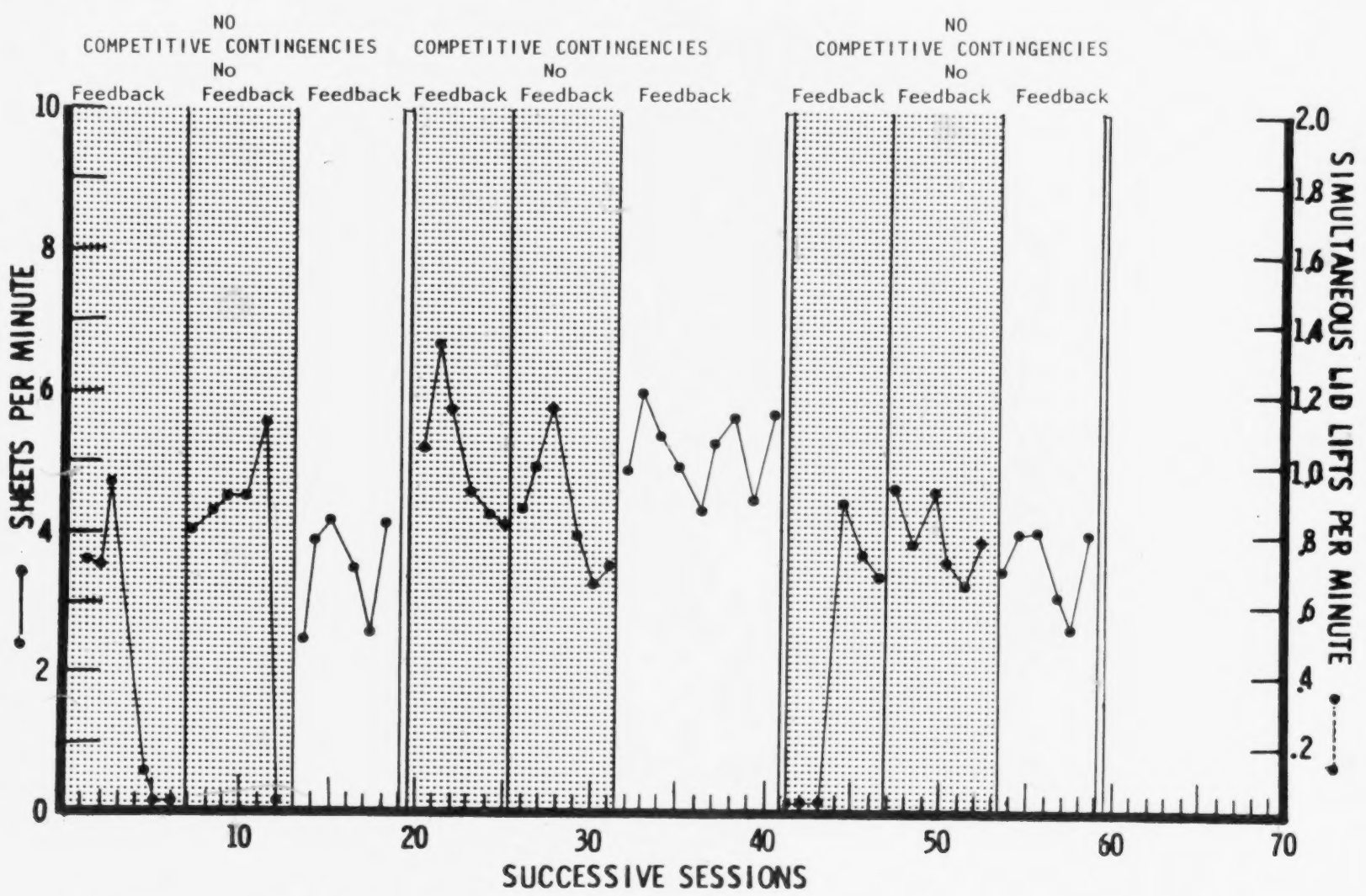
Figure 17


S4
NO
COMPETITIVE CONTINGENCIES
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Feedback
COMPETITIVE CONTINGENCIES
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SHEETS PER MINUTE
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Figure 18

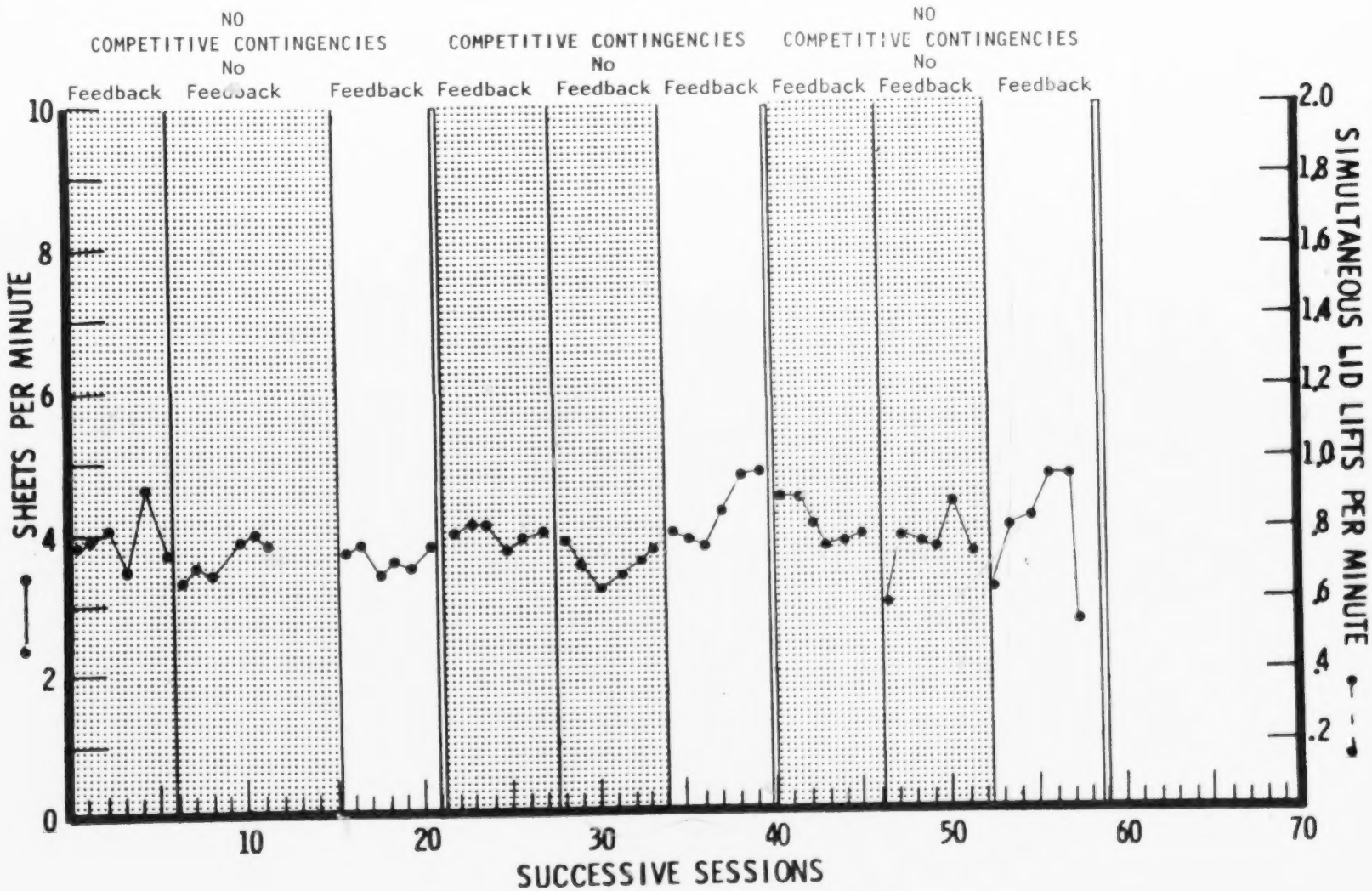
NO
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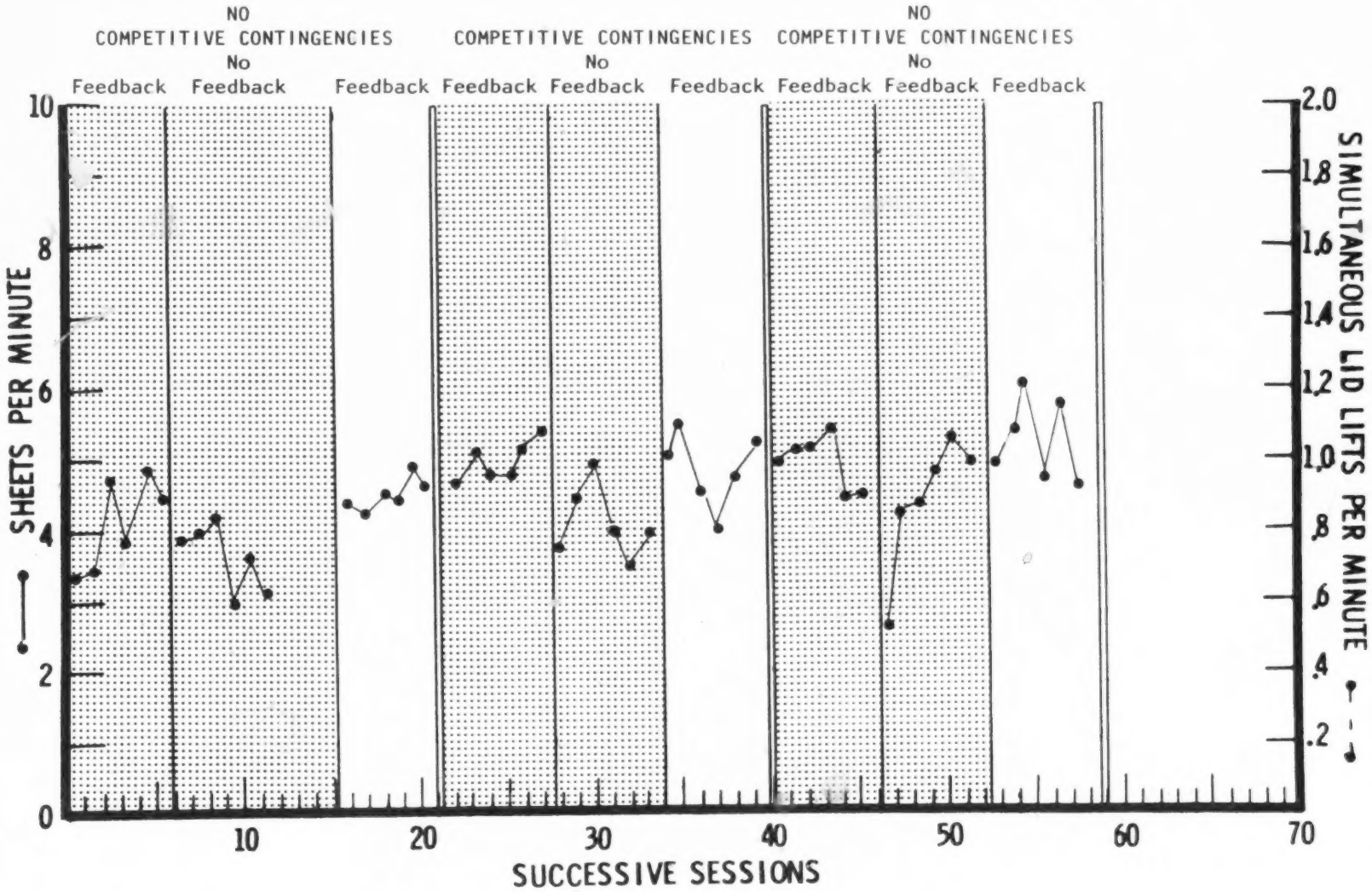
Figure 19


S5
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Feedback
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COMPETITIVE CONTINGENCIES
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SIMULTANEOUS LID LIFTS PER MINUTE
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Figure 20

and S6, simultaneous lid lifts and academic performance were a function of feedback only during the CC condition. The rate of simultaneous lid lifts for S4 during CC for the manipulations feedback, no feedback, feedback were: .26, .06, and .21 (Figure 21); for S5: .23, .11, and .21 (Figure 22); and for S6: .15, .07, and .14 (Figure 23). The rate of academic performance for S4 during CC for the manipulations feedback, no feedback, feedback were: 4.96, 3.52, and 5.03 (Figure 21); for S5: 4.80, 3.97, and 4.64 (Figure 22); and for S6: 3.82, 3.42, and 4.05 (Figure 23).

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Insert Figures 21-24 about here

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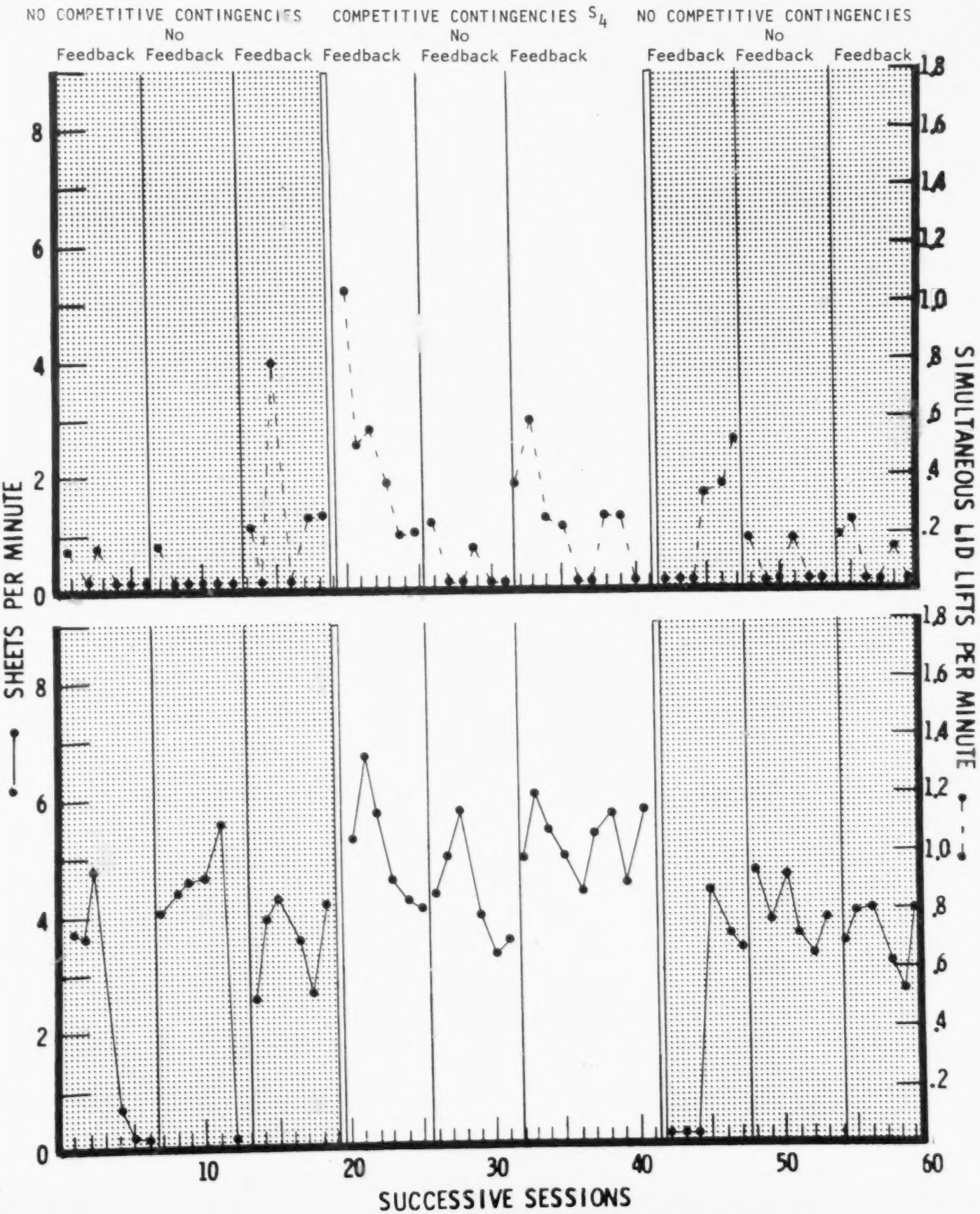
The data for S3 are interesting and unusual. The upper graph of Figure 24 present simultaneous lid lift rates. Lid lift rates increase with the introduction of competitive contingencies and during this condition they are a function of feedback. The mean lid lift rates during feedback, no feedback, feedback were: .32, .06, .19. Also the academic performance appears to be a function of feedback if one only observes performance up to and including the 15th session of the CC condition (lower graph). The mean rates up to this session were 5.72, 2.62, and 7.21. At the onset of the 16th session S3 quit performing, his rate dropped to zero and remained there for 3 sessions. Three additional sessions were continued during the same condition. S3 still did not perform.


NO COMPETITIVE CONTINGENCIES
No Feedback
Feedback
COMPETITIVE CONTINGENCIES S_4
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Feedback
NO COMPETITIVE CONTINGENCIES
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Figure 21

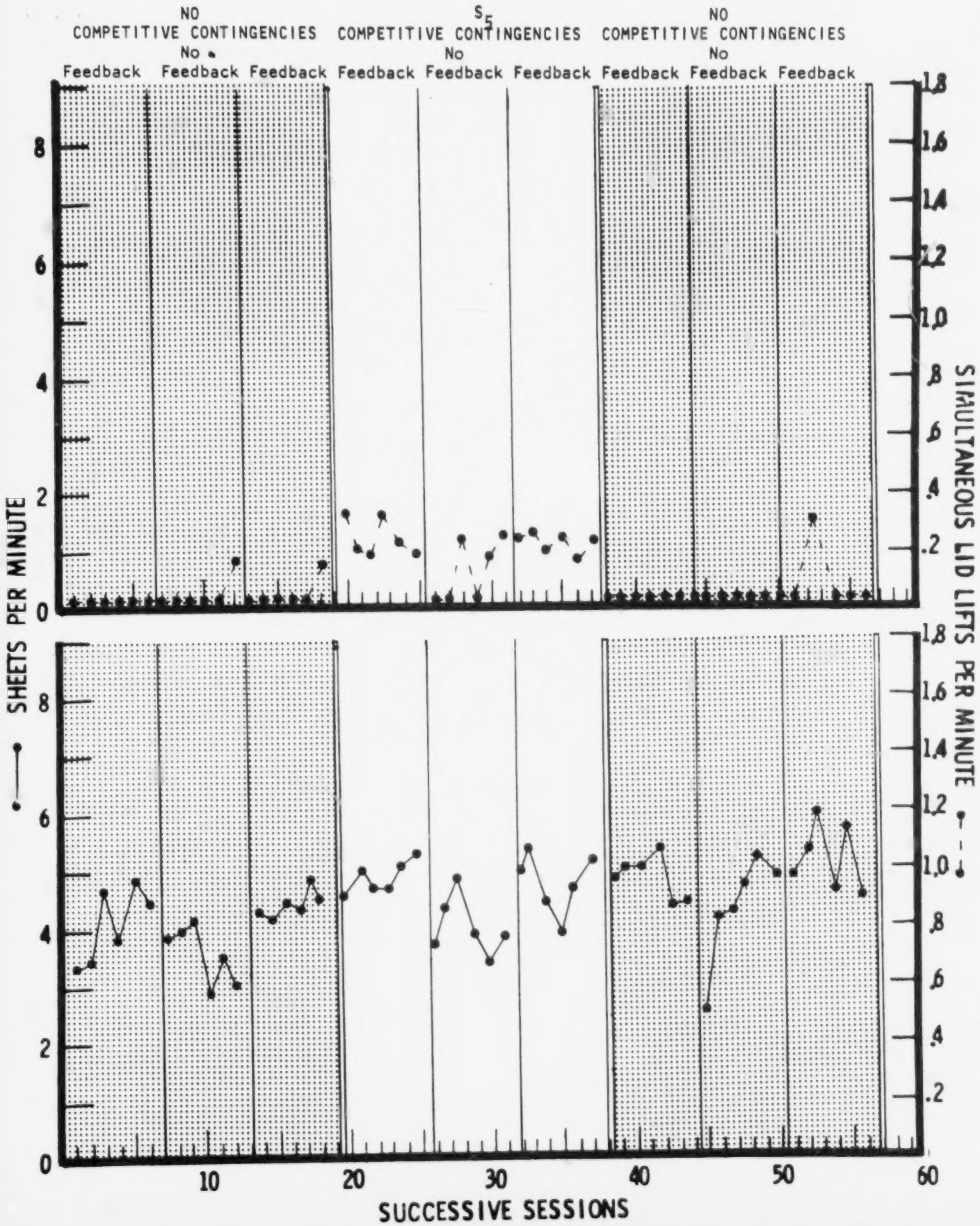
NO
COMPETITIVE CONTINGENCIES
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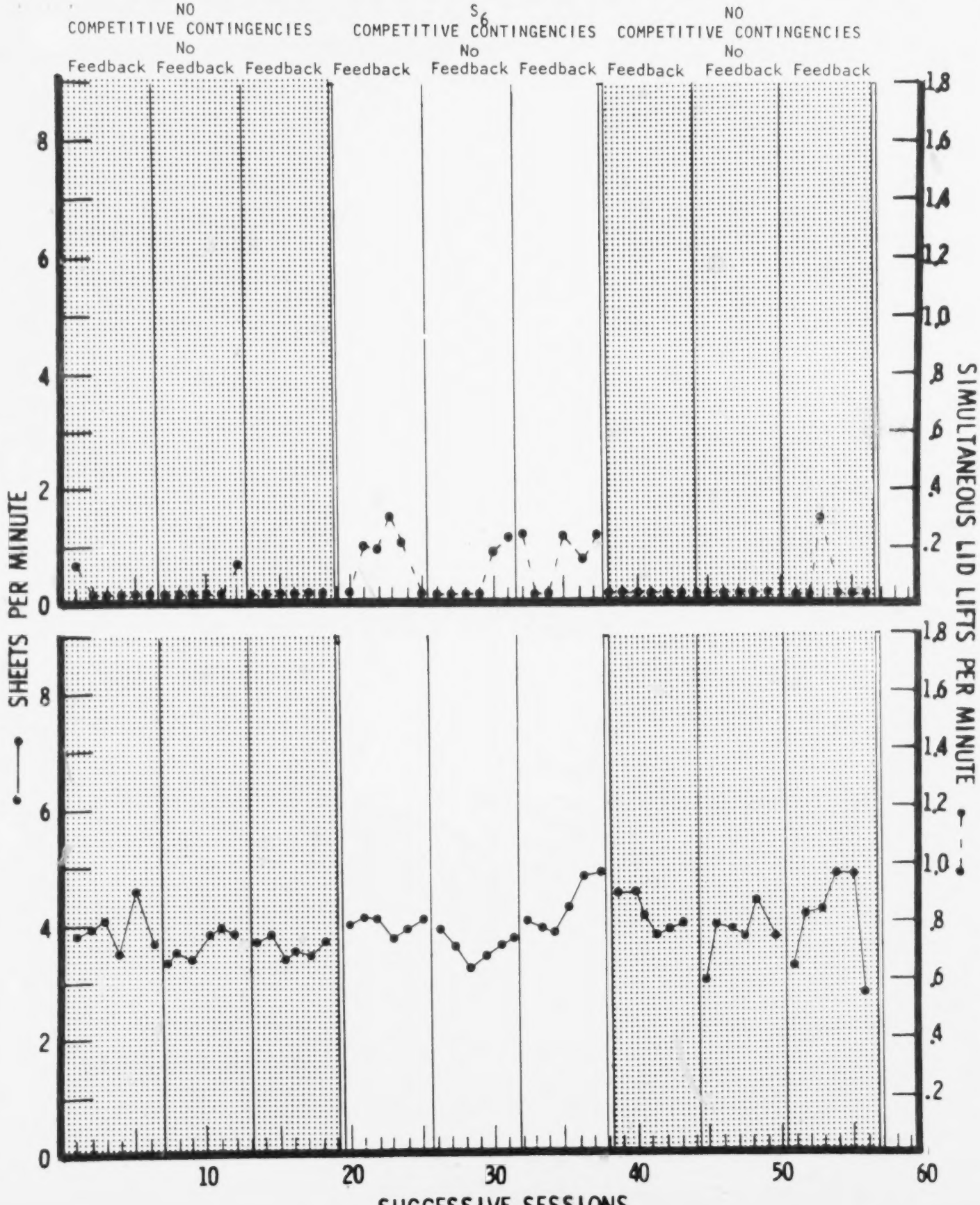
Figure 22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COMPETITIVE CONTINGENCIES
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S6
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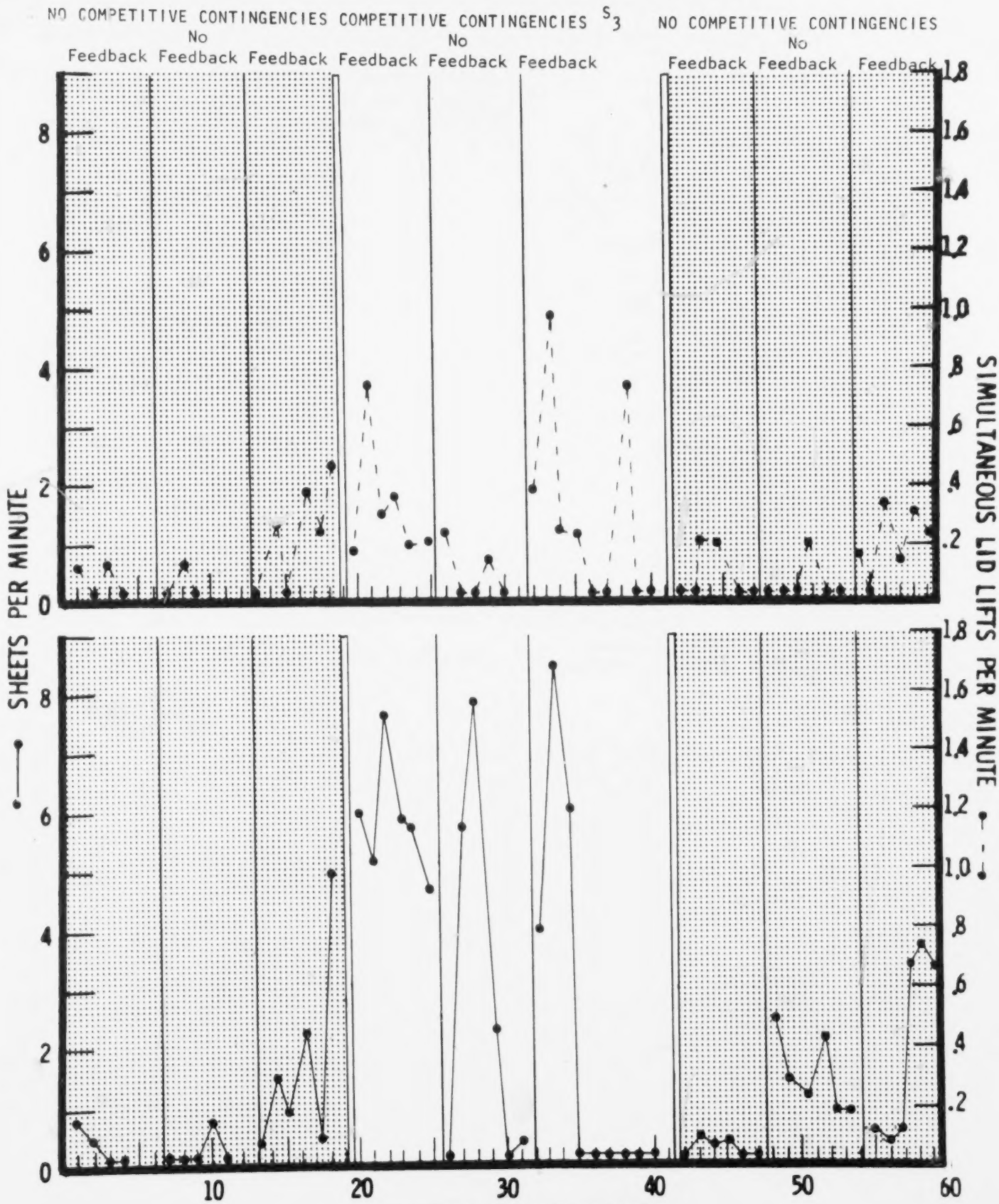
SUCCESSIVE SESSIONS

Figure 23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Feedback
SHEETS PER MINUTE
SIMULTANEOUS LID LIFTS PER MINUTE
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Figure 24

Discussion

Experiment II demonstrated that 1 minute of extra free time for producing a higher response rate was effective in producing social comparisons, increasing rates of academic performance, and producing and increasing competitive behavior for some of the six subjects.

Experiment III demonstrated that 10 minutes of extra free time increased the academic performance for three of the four remaining S's and produced competition for four of the four remaining subjects that did not respond to the one-minute extra condition of Experiment II. The data for one subject, S3, however, presented an interesting deviation from this general finding. Although he competed during competitive contingencies, he quit competing before the condition ended. In short, the 10-minute extra condition produced but did not maintain his competitive behavior. Additional research on this subject and others is currently addressing the questions raised by this finding. The variable maintaining competition may be the work-reward ratio effective prior to and during competitive contingencies. S3 and S4 were on the highest work to reward ratio, 30:1. S5 and S6 were on a 15:1 ratio and S1 and S2 were on a 4:1 ratio. Preliminary data indicate that a change in ratio from 30:1 to 15:1 has a dramatic effect on the performance rates of S3 and S4. The next step in the investigation is to introduce competitive contingent conditions while subjects are on a 15:1 work-reward schedule. Another interesting occurrence in need of further investigation was the failure of S5's academic performance rate to decrease after competitive contingencies were withdrawn. Other variables than the CC conditions are maintaining the increased performance of S5.

Conclusion

One of the purposes of this study was to define competition functionally so that the conditions producing the process might be systematically examined using the method of experimental analysis. The second objective was to utilize this functional definition while investigating the effects of competitive contingencies on social comparisons, academic performance and competition. The findings of the research suggest that social comparisons, academic performance and competition are a positive function of the amount of the competitive contingent reward. Although one minute extra of free time for higher rates produced social comparisons, increased academic performance and competition for some subjects, a greater reward, 10 minutes extra of free time, produce higher rates of academic performance and competition in the remaining S's. Data for two subjects suggest that this general finding needs qualification. Although the amount of the competitive contingent reward may be important in producing competition, other variables such as the work-reward schedule may be important in maintaining the behavior.

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